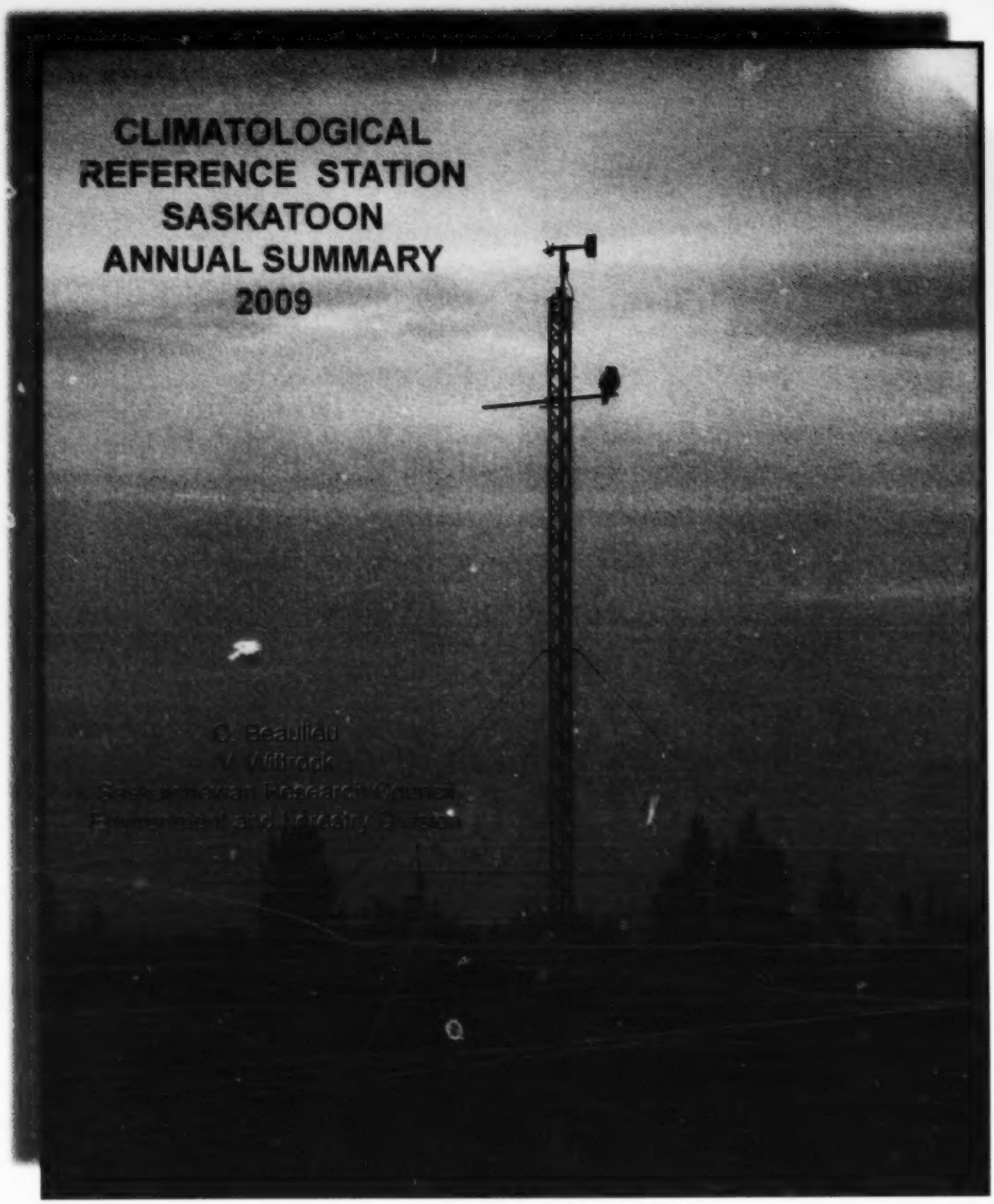
CLIMATOLOGICAL REFERENCE STATION SASKATOON ANNUAL SUMMARY 2009



C. Beaulieu
V. Wittrock
Saskatchewan Research Council
Environment and Forestry Division

SRC Publication No. 10440 - 1E10
February 2010

Saskatchewan Research Council

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ANNUAL SUMMARY 2009

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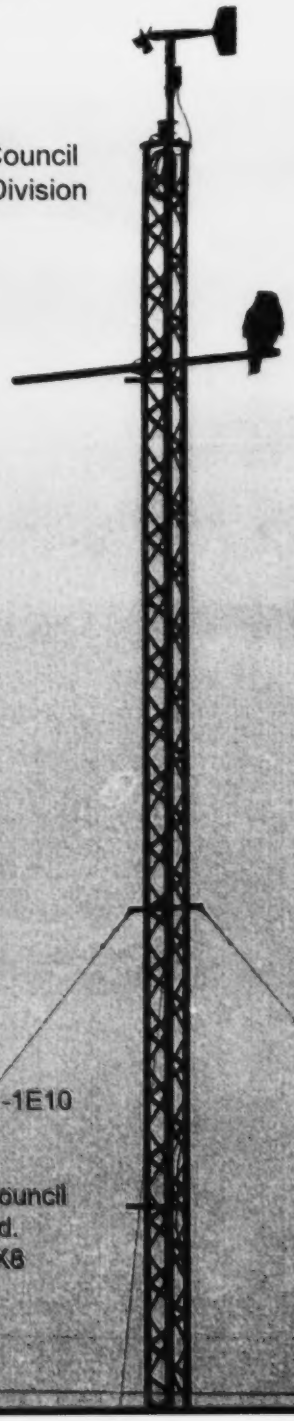

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COVER PHOTOGRAPH
Morning Perch. August 2009
photo credit: CR Beaulieu

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This report is being provided for informational purposes only. While the Saskatchewan Research Council believes this report to be accurate, it may contain errors or inaccuracies. SRC assumes no responsibility for the accuracy or comprehensiveness of this data and reliance on this data is entirely at the user's own risk.

Please be aware that our data is subject to ongoing quality assurance reviews that may result in minor changes and updates to some values in our reports, including past reports. If you notice errors in our reports, please contact us so that we may correct them.

Enquiries concerning the SRC Climatological Reference Station (CRS), its data, measurement programs and publications, or becoming a sponsor are most welcome. For further information contact:

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SASKATCHEWAN RESEARCH COUNCIL
CLIMATE REFERENCE STATION SPONSORS, 2009
WE GRATEFULLY ACKNOWLEDGE THE SUPPORT OF THE FOLLOWING:

SaskPower

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Ministry of Energy and Resources

Kipp & Zonen

Saskatchewan Ministry of Agriculture

Agriculture and Agri-Food Canada

Agriculture et Agroalimentaire Canada

UNIVERSITY OF SASKATCHEWAN

CLIMATE REFERENCE STATION HISTORY

Meteorological observations at or near Saskatoon were first taken by the Royal Northwest Mounted Police in 1889 with the recording of temperature. There is some disagreement in the early records as to the exact location of the weather observing point, but the majority of the evidence indicates 52°15'N, 106°20'W, elevation 480m above sea level as the most probable location. This would place it at Clark's Crossing on the South Saskatchewan River, approximately 16 km northeast of the centre of the City of Saskatoon. At that time, there was a settlement at Clark's Crossing as well as 10 to 15 families on either side of the river where Saskatoon is now located.

Little is known about the very early observers; however, the records do show that Major T.H. Keenan took observations from March 1892 until March 1895, and Mr. George Will was the observer from January 1897 until April 1897. It is thought that T. H. Copeland was involved in the observational programme from 1895 to May 1, 1901, at which time it was taken over by Mr. Eby, Sr. Mr. Eby, Sr. recorded the observations until his death in 1921, at which time his daughter, Miss E.S. Eby, continued to record the observations. Her brother, Mr. J.M. Eby, recorded the observations beginning in April 1931 until the station was closed October 31, 1942. The Eby station recorded temperature, precipitation and weather notes on fog, thunderstorms, winds and any unusual weather phenomena. Reports were made twice daily, morning and evening.

In 1916, a climatological station was established by the Physics Department of the University of Saskatchewan and continuous observations were kept twice daily until January 15, 1965. The longtime observer was Mr. Sidney Cox. The Saskatchewan Research Council took over the programme in the fall of 1963 at the newly established Climatological Reference Station at latitude 52°09'N, longitude 106°36'W and elevation 497 m asl[1]. The first observer was Terry Beck followed three years later by Orville Olm.[2] In 1967, Joe Calvert became the primary observer until his retirement in 1983. Ray Begrand succeeded Mr. Calvert until 1988 when Virginia Wittrock became the primary observer. Since 1992, the primary observer has been Carol Beaulieu assisted by Virginia Wittrock.

In the summer of 1992, the CRS began to be converted to an automated system of data collection with the installation of a Campbell Scientific data logger and automatic sensors. Elements presently recorded at the site are temperature, precipitation, wind, solar radiation, relative humidity, barometric pressure, soil temperature and snow-on-the-ground (manual recordings). Temperature, precipitation and bright sunshine data are submitted to Environment Canada.

[1]Christiansen 1970; Environment Canada 1975; [2]Olm 2001

Mr. James Eby was one of the original members of the Temperence Colony Society. He filed his homestead in 1882 and returned with his family in 1883. He was the first president of the school board and served as the township supervisor for Natana. While riding a horse in 1890, he was struck by lightning and was a partial invalid thereafter. In 1901, he and his daughter moved to Natana and James served as a Federal Meteorologist for the next 20 years until his death in 1921 at the age of 77. He was buried, next to his wife, in the Natana pioneer cemetery.[1]

[1]Ladd, 2008

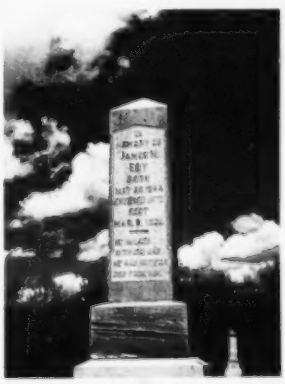


photo credit: CR Beaulieu

WHAT IS THE CLIMATE REFERENCE STATION?

The Saskatchewan Research Council's Climate Reference Station (SRC CRS) at Saskatoon is classified as a principal climatological station with supplementary climatological observations.[1] A reference climatological station's data are intended for the purpose of determining climatic trends. This requires long periods (not less than thirty years) of homogeneous records, where man-made environmental changes have been or are expected to remain at a minimum. Ideally the records should be of sufficient length to enable the identification of secular changes of climate[2]. At our station, half-hourly readings are taken of elements which include temperature, precipitation amount, humidity, wind, and atmospheric pressure. Our supplemental observations include rate of rainfall, soil temperature, bright sunshine and solar radiation. High quality and consistent climatological observations are maintained providing data sets to meet the current concerns of the effects of climatic change and increased variability.

Purpose and Benefits

The purpose of the SRC CRS is to provide a record of observed meteorological elements so that the climate of the area and its changes can be accurately documented and described. Climatological data have assumed new importance as a result of social and environmental issues in which climate is a dominant factor. Climatological information assists in realizing new technological opportunities and social changes. It is necessary and valuable for areas such as agriculture, forestry, land use and facility placement, water and energy resources, health and comfort.

The CRS also allows us to:

- evaluate long term climate trends - early warning system for increased frequencies of extreme events such as drought, floods, *etc.;*
- determine the impacts of climate events on society, economy, health, and ecosystems - *e.g.* intense rainfall causing flooding and property damage, heat stress with its implications for health;
- do value-added research;
- be part of regional, national and global networks in an important agricultural and ecological area;
- facilitate development of additional programs - *e.g.* air quality, biodiversity, and climate change monitoring;
- have roles in various programs within SRC including spray drift work, Boreal Ecosystem Atmosphere Study (BOREAS), and collaborative research with the Western College of Veterinary Medicine and the College of Agriculture, University of Saskatchewan, for example; and
- provide climate data to accident studies, agricultural sectors, authors, building science, chemical companies, construction firms, governments, insurance agencies, lawyers, media, recreation facilities, schools, tourism groups, transportation studies, universities, wildlife studies, and interested individuals.

Goals

The goals of the Climate Reference Station are first, to maintain the high quality of data gathered over its more than forty-five years of existence at its current location and, second, to continue to monitor a large variety of elements. These various elements combined with the long-term collection period as well as the stable location allow CRS to be an extremely valuable climate information collection station.

[1]*Environment Canada 1992* [2]*World Meteorological Organization 1988*

photo credit: V. Wittrock, June 2009

ACTIVITIES ASSOCATED WITH THE CLIMATE REFERENCE STATION, 2009

WP Bates school hosted the fifth year of the SPLIT programme (Schools Plant Legacy in Trees) and requested a presentation on climate for their kindergarten to grade 8 participants. Approximately 244 students received hands-on experience with the weather instruments or a computer presentation highlighting Saskatoon's climate; past, present and future and why consideration of the climate is necessary for the planning of the urban landscape. The rural school of Cory Park also requested the presention for their 24 children studing the climate of the area.

In celebration of CRS 45th year, new soil probes at the seven standard depths were installed. The old probes will be retired after 43 years of service once a comparison between the old and new sets has been established. We welcomed the media, the mayor of Saskatoon and other guests to the site on September 28th to celebrate our 45th year and the installation.

CRS continues to host other projects such as SODAR; a device to monitor wind speed and direction up to 200m, TEOM; a instrument that measures air pollution down to 10 microns, and the University of Saskatchewan's silage experiment.

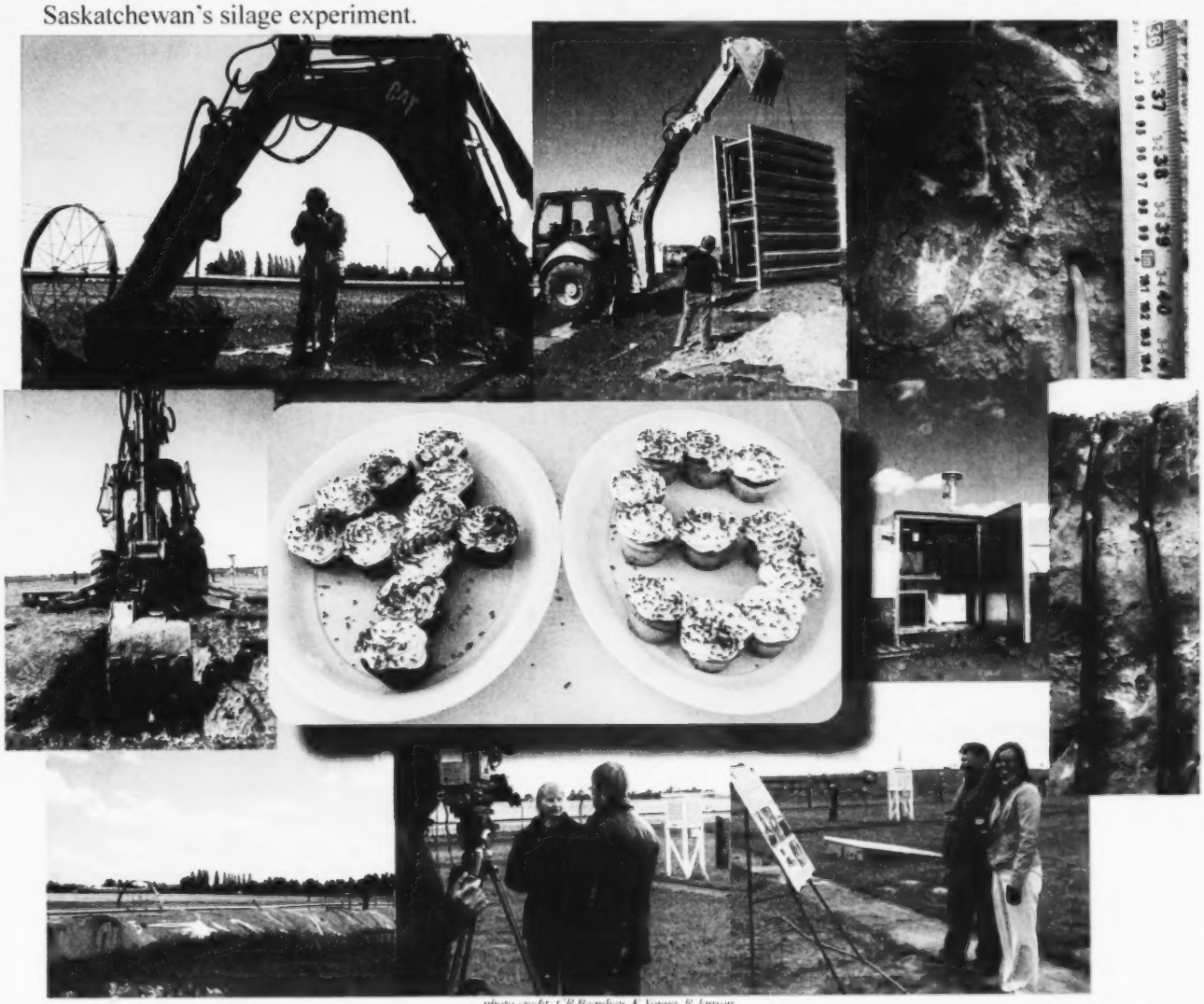


photo credit: C.R.Beaubien, K.Young, R.Jansson

SUMMARIES FOR 2009
Overview

Data concerning temperature, precipitation, wind speed and direction, bright sunshine, solar radiation, and soil temperatures, recorded at the Saskatchewan Research Council (SRC) Climatological Reference Station (CRS) (52°09'N, 106°36'W, 497 m asl), are presented for the year 2009 and compared with the long-term (*circa* 1900-2008) and standard-period/normal (1971-2000) records.

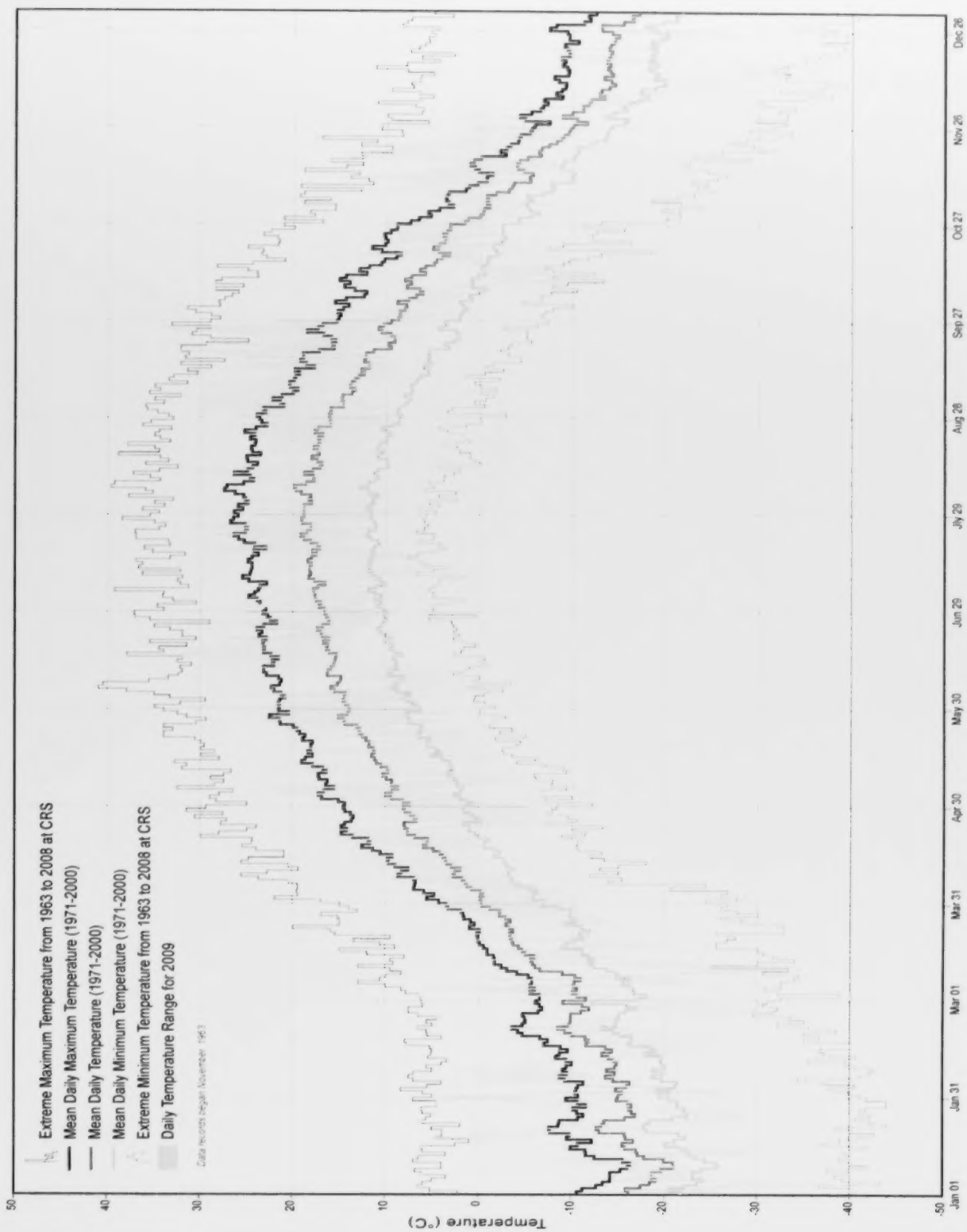
The *Webster's New English Dictionary and Thesaurus* defines 'weird' as '*strange, mysterious, eerie, and bizarre*.' For an example, they could have cited the temperatures for 2009 as documented at the climate site. A cold,dry spring introduced a cool wet, summer which morphed into a mixed autumn. It was a rollercoaster ride with record high September temperatures dipping down to the 4th coldest October, rebounding to a record warm November and finishing off the year with a freezing December. It was the sixteenth coldest year at CRS and would have ranked colder except for September's and November's high temperatures. The year experienced 16 days of -30°C temperatures; two of which were less than or equal to -35°C. For hot days, only six topped the 32°C mark; five of which were in September. Despite the cool year, the frost-free season was longer than average. It began on June 5th and last until October 7th; 123 days. Growing degree-days were continuously below normal throughout the year.

Precipitation was also below normal throughout the year; especially between the end of March and August 15th. It was the driest spring on record with only 19.0 mm being recorded. However, the longest dry spell of 30 days was between November 2nd and December 1st. August was the wettest month with a total of 98.8 mm; 85% of which occurred mid month. June recorded the wettest day on the 21st when 40.8 mm fell. The winter snowpack disappeared by March 31st and started to rebuild on December 7th.

Annual bright sunshine ranked in the top ten years for the most hours despite July and August having below normal hours and October with record below normal hours of 69.9. Overall, 2009 received 56% of the possible bright sunshine on 331 days.

Winds during the year peaked on September 29th with a gale force wind of 75 km/h from the SSE. Gale force winds between 63 and 76 km/h occurred eight other times during the year. The strongest average winds were from the northwest while the most frequent wind direction was from the WNW and SE. Wind chill values peaked at -46.4 on January 3rd and 4th when the minimum daily temperatures were -35.6°C and -37.4°C respectively. Daily wind speed maximums were below 31 km/h on those days. During the year, 28 days had values where frostbite risk is high after 5 to 10 minutes exposure for most people.

DAILY TEMPERATURE



TEMPERATURE

TEMPERATURE RECORDS °C

TYPE*	DATE	NEW RECORD	OLD RECORD/year
Extreme High Maximum Daily Temperature (°C)	Jan 18	5.3	4.5/1991
	Jun 14	33.2	32.0/1987
	Jun 25	31.7	29.0/1990
	Sep 03	34.1	32.2/1982
	Sep 17	32.8	32.2/1976
	Sep 23	33.0	30.5/1994
	Sep 24	34.5	29.0/1990
	Nov 06	6.8	12.8/1969
	Nov 16	14.2	12.5/1979,2001
	Nov 17	15.3	12.8/1976
	Nov 18	12.2	9.5/1987,1995
Lowest Maximum Daily Temperature (°C)	Mar 09	-21.2	-17.7/2003
	Mar 10	-23.5	-15.7/1998
	Mar 11	-17.3	-15.3/2003
	Apr 08	1.7	1.9/1996
	Apr 14	2.2	6.0/1983
	Apr 20	6.9	8.0/2004
	Jly 08	18.0	18.0/2004
	Jly 11	14.0	18.5/1993
	Oct 09	-2.1	0.5/1987
	Oct 10	-0.9	-0.6/1969
	Oct 11	-2.1	-0.8/1998
	Oct 13	0.5	2.0/1998
	Dec 12	-28.4	-23.0/1993
	Dec 13	-27.7	-23.9/1986
Highest Minimum Daily Temperature (°C)	Jan 17	-5.0	-6.5.2001
	Jan 18	-1.5	-4.0/1991
	Jun 20	15.5	14.3/1991
	Sep 03	17.0	15.0/1969
	Sep 04	16.3	15.7/1997
	Sep 14	13.6	12.0/1991
	Sep 17	14.2	13.3/1976
	Sep 18	12.3	11.5/1994,2000
	Sep 23	10.1	9.7/1997
	Sep 26	11.1	10.7/2001
	Nov 17	4.7	1.0/1991
	Nov 30	-0.7	-3.0/1993
Extreme Low Minimum Daily Temperature (°C)	Feb 26	-32.6	-31.7/1972
	Mar 11	-33.4	-25.1/1998
	Jun 05	-0.5	1.1/1967
	Jun 10	1.6	1.7/1969
	Jly 10	6.7	6.7/1973
	Jly 15	7.0	7.8/1969
	Jly 16	6.2	6.7/1979
	Oct 13	-7.5	-6.9/1998
	Dec 13	-33.9	-32.8/1972

TEMPERATURE RECORDS °C

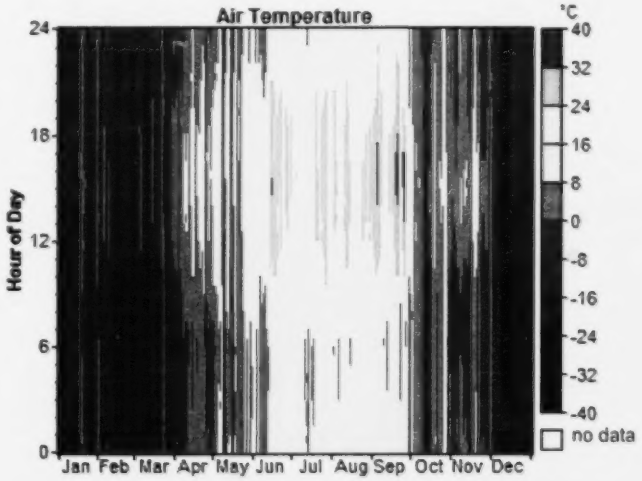
TYPE*	DATE	NEW RECORD	OLD RECORD/year
Highest Mean Daily Temperature (C°)	Jan 17	-2.2	-3.6/1976, 2001
	Jan 18	1.9	0.3/1991
	Jan 19	-4.4	-4.7/1968, 1974
	Jun 14	24.5	22.7/2003
	Jun 20	21.5	21.8/1988
	Sep 03	25.6	21.4/1978, 2005
	Sep 17	23.5	22.8/1976
	Sep 19	23.8	20.5/1981
	Sep 20	15.3	14.8/1987
	Sep 23	21.6	19.0/1994
	Sep 24	23.3	20.8/1990
	Nov 06	9.3	7.3/1988
	Nov 17	10.0	3.3/1991
	Nov 18	5.8	3.8/2005
	Nov 30	1.8	1.4/1997
Lowest Mean Daily Temperature (C)	Mar 09	-25.0	-22.8/1975
	Mar 10	-28.1	-23.3/1980
	Mar 11	-25.4	-18.3/2003
	Apr 14	0.5	2.5/1983
	Apr 20	3.2	3.9/2004
	Jun 07	7.2	8.3/1982
	Jun 09	8.4	10.3/1984, 2000
	Jly 11	10.4	12.0/1993
	Jly 15	12.3	12.6/1999
	Oct 08	-4.2	-3.9/1970
	Oct 09	-5.4	-5.3/1970
	Oct 10	-3.2	-2.0/1969
	Oct 12	-3.7	-3.7/2006
	Oct 13	-3.5	-1.5/1998
	Dec 12	-30.7	-27.0/1971
	Dec 13	-30.8	-27.3/1973
Greatest Low Maximum Monthly Temperature(°C)	Nov 21	1.0	-2.3/Nov23,2004
Greatest Low Minimum Monthly Temperature(°C)	Sep 28	1.2	1.0/Sep30,1994
	Nov 21	-10.5	-10.5/Nov30,1981
Greatest High Mean Monthly Temperature(°C)	Sep 03	25.6	25.6/Sep04,1978
Least High Mean Monthly Temperature(°C)	Sep 17	9.0	9.2/Sep09,2002
Greatest Low Mean Monthly Temperature(°C)	Nov 23	-4.2	-6.6/Nov28,2004
Greatest Minimum Seasonal Temperature(°C)	Autumn	1.3	0.4/2005
Greatest Mean Seasonal Temperature(°C)	Autumn	6.7	6.4/1987

* see 'Temperature Nomenclature' in References and Bibliography

EXTREME TEMPERATURES

COLD SPELL (less than or equal to -30°C)		HOT SPELL (greater than or equal to 30°C)	
DATE	TEMPERATURE °C	DATE	TEMPERATURE °C
January 3	-35.6	May 30	31.3
January 4	-37.4	June 14	33.2
January 14	-33.1	June 15	32.0
January 15	-31.5	June 16	31.3
January 26	-31.2	June 17	31.3
February 26	-32.6	June 25	31.7
February 27	-30.3	July 18	31.4
March 10	-32.7	July 25	31.0
March 11	-33.4	August 10	30.9
December 8	-31.8	September 1	30.7
December 11	-30.0	September 2	30.6
December 12	-33.0	September 3	34.1
December 13	-33.9	September 17	32.8
December 14	-31.4	September 19	34.6
December 15	-32.9	September 23	33.0
December 31	-31.8	September 24	34.5
		Coloured cells indicate extremes	

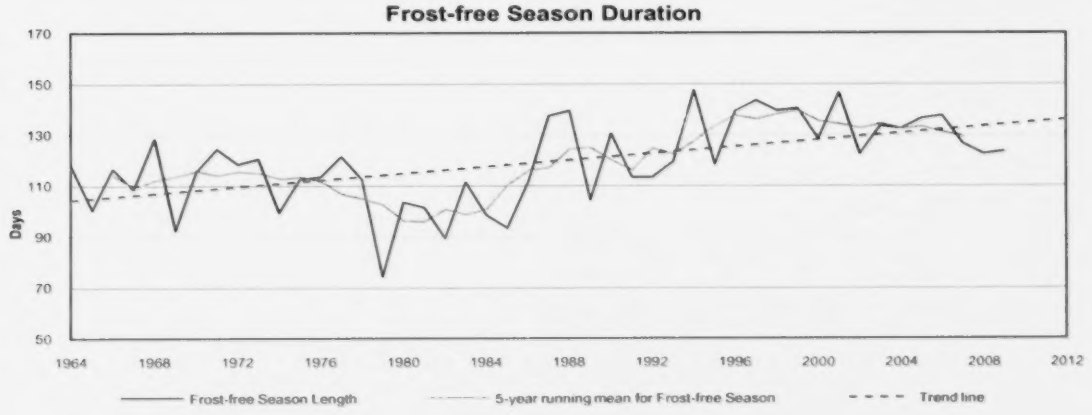
HOURLY ANNUAL TEMPERATURE

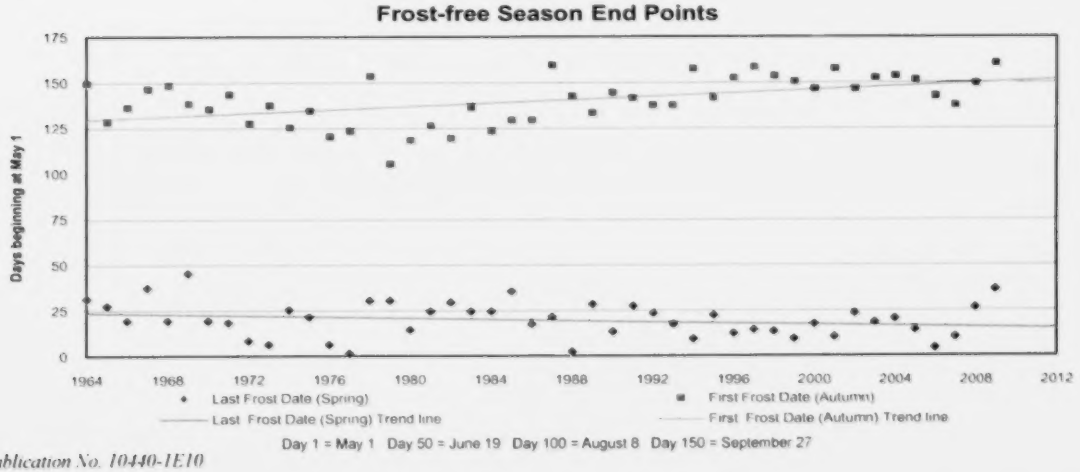


TEMPERATURE

DATES & DURATION OF THE FROST-FREE SEASON			
YEAR	LAST SPRING FROST	FIRST FALL FROST	Frost-free Season Length
1964	May 31	Sept 26	117
1965	May 27	Sept 05	100
1966	May 19	Sept 13	116
1967	Jun 06	Sept 23	108
1968	May 19	Sept 25	128
1969	Jun 14	Sept 15	92
1970	May 19	Sept 12	115
1971	May 18	Sept 20	124
1972	May 08	Sept 04	118
1973	May 06	Sept 14	130
1974	May 25	Sept 02	99
1975	May 21	Sept 11	112
1976	May 06	Aug 28	113
1977	May 01	Aug 31	121
1978	May 30	Sept 30	122
1979	May 30	Aug 13	74
1980	May 14	Aug 26	103
1981	May 24	Sept 03	101
1982	May 29	Aug 27	89
1983	May 24	Sept 13	111
1984	May 24	Aug 31	98
1985	Jun 04	Sept 06	93
1986	May 17	Sept 06	111
1987	May 21	Oct 06	137
1988	May 02	Sept 19	139

DATES & DURATION OF THE FROST-FREE SEASON			
YEAR	LAST SPRING FROST	FIRST FALL FROST	Frost-free Season Length
1989	May 28	Sept 10	104
1990	May 13	Sept 21	130
1991	May 27	Sept 18	113
1992	May 23	Sept 14	113
1993	May 17	Sept 14	119
1994	May 09	Oct 04	147
1995	May 22	Sept 18	118
1996	May 12	Sept 29	139
1997	May 14	Oct 05	143
1998	May 13	Sept 30	139
1999	May 09	Sept 27	140
2000	May 17	Sept 23	128
2001	May 10	Oct 04	146
2002	May 23	Sept 23	122
2003	May 18	Sept 29	133
2004	May 20	Sept 30	132
2005	May 14	Sept 28	136
2006	May 04	Sept 19	137
2007	May 10	Sept 14	126
2008	May 26	Sept 26	122
2009	June 05	Oct 07	123
1971 - 2000 Normal	May 18	Sept 14	116.9





TEMPERATURE RANKINGS

ANNUAL AVERAGE TEMPERATURES °C

MAXIMUM TEMP °C		MINIMUM TEMP °C		MEAN TEMP °C	
1987	11.6	1987	-0.8	1987	5.4
2001	10.8	2006	-1.3	2001	4.6
1981	10.5	1999	-1.4	1981	4.5
1988	10.1	1981	-1.5	1998	4.3
1998	10.1	1998	-1.5	1999	4.2
1999	9.8	2005	-1.6	2006	4.2
2006	9.6	2001	-1.6	1988	3.9
1976	9.5	2007	-2.2	2005	3.8
1997	9.5	1988	-2.3	1997	3.5
2003	9.3	1997	-2.4	2003	3.4
2005	9.1	2003	-2.5	1991	3.2
1986	9.0	1993	-2.5	1986	3.2
1991	8.9	1991	-2.5	2007	3.2
2000	8.8	1992	-2.5	1976	3.0
1984	8.7	1986	-2.6	1992	3.0
1990	8.7	2004	-2.8	2000	3.0
1977	8.6	2002	-2.9	1984	2.9
1980	8.6	1984	-2.9	1993	2.8
2007	8.6	2000	-2.9	2004	2.8
1992	8.5	1964	-2.9	2002	2.8
2008	8.5	1994	-3.2	1964	2.7
2002	8.5	1983	-3.2	1994	2.7
1994	8.5	2008	-3.3	2008	2.6
2004	8.4	1995	-3.4	1990	2.6
1989	8.3	1968	-3.4	1977	2.5
1964	8.2	1976	-3.5	1980	2.4
1993	8.1	1990	-3.6	1989	2.3
1995	7.9	1977	-3.6	1995	2.3
1973	7.8	1989	-3.8	1983	2.2
1968	7.7	1980	-3.8	1968	2.2
2009	7.7	2009	-3.8	2009	2.0
1983	7.7	1973	-4.0	1973	1.9
1978	7.4	1970	-4.0	1970	1.7
1970	7.3	1978	-4.6	1978	1.4
1974	7.1	1969	-4.6	1971	1.2
1971	7.1	1971	-4.6	1974	1.2
1967	7.0	1974	-4.7	1967	1.1
1985	6.9	1967	-4.7	1969	1.1
1975	6.9	1985	-4.8	1985	1.1
1969	6.8	1972	-4.8	1975	0.9
1979	6.5	1975	-5.1	1972	0.6
1966	6.4	1996	-5.2	1979	0.6
1965	6.3	1965	-5.3	1965	0.5
1982	6.2	1982	-5.3	1966	0.4
1996	6.1	1979	-5.3	1996	0.4
1972	6.1	1966	-5.5	1982	0.4

SEASONAL MAXIMUM AVERAGE TEMPERATURES °C

WINTER (DJF)		SPRING (MAM)		SUMMER (JJA)		AUTUMN (SON)	
1987	-3.6	1977	12.9	2001	26.5	1987	13.1
2006	-4.7	1987	12.7	2003	26.3	2009	12.1
1998	-4.8	1988	12.6	1984	26.1	1994	11.8
2000	-5.4	1981	12.1	1988	26.0	2001	11.8
1992	-5.7	1998	12.0	1970	25.9	2008	11.8
2002	-6.0	2001	11.9	2006	25.6	1999	11.4
1964	-6.6	1994	11.5	1998	25.6	1981	11.1
1983	-7.1	1993	11.4	1997	25.6	1997	11.0
1988	-7.2	1980	11.3	1981	25.3	2005	11.0
2004	-7.2	1986	11.1	1989	25.3	1976	10.8
1986	-7.3	2000	11.0	2002	25.3	1980	10.8
1976	-7.3	1992	10.8	1983	25.0	1974	10.6
1981	-7.4	1991	10.5	1996	24.9	1979	10.6
1977	-7.4	1976	10.4	1991	24.8	2004	10.5
2007	-7.7	1984	10.2	1964	24.6	1998	10.4
2003	-8.0	1999	10.1	2008	24.5	1967	10.4
2005	-8.0	2007	10.1	2007	24.5	2000	10.3
1975	-8.0	2006	10.1	1979	24.5	1988	10.3
1999	-8.0	1968	10.0	1995	24.4	1975	9.9
1984	-8.1	2004	10.0	1967	24.3	1989	9.8
1995	-8.1	1985	10.0	1978	24.2	2007	9.8
1990	-8.2	1990	10.0	1965	24.2	1990	9.7
1991	-8.6	2005	9.9	1969	24.1	1968	9.7
1989	-8.7	1973	9.9	1990	24.1	2003	9.4
2001	-9.3	1978	9.7	1987	24.0	1970	9.3
1970	-9.3	2003	9.4	1972	24.0	1983	9.2
1980	-9.5	2008	9.1	1976	23.8	1992	8.8
1968	-9.8	1972	9.1	1973	23.8	1971	8.8
2008	-10.1	1971	8.6	2000	23.8	1964	8.8
1973	-10.3	1969	8.3	1971	23.6	1978	8.7
1997	-11.0	1995	8.3	1986	23.6	1977	8.7
1967	-11.1	1989	8.2	1994	23.5	1966	8.6
1993	-11.5	1964	8.2	1980	23.5	1995	8.6
1985	-11.6	1966	8.1	1975	23.2	1993	8.4
2009	-11.5	1997	7.6	1999	23.1	1982	8.3
1994	-12.1	2009	7.4	1977	23.0	1969	8.0
1996	-12.2	1983	7.0	2009	22.9	2002	7.8
1974	-12.6	1982	6.7	1966	22.8	2006	7.5
1966	-13.1	1996	6.3	1982	22.6	1986	7.3
1982	-13.3	1970	6.1	2005	22.6	1965	7.3
1971	-13.4	2002	5.8	1985	22.4	1973	7.3
1978	-14.5	1965	5.7	1974	22.4	1991	7.0
1965	-14.8	1979	4.8	1992	22.4	1972	6.6
1972	-14.9	1974	4.7	1968	22.0	1996	6.2
1969	-15.2	1975	4.4	2004	21.6	1984	5.6
1979	-15.5	1967	4.4	1993	21.1	1985	4.5

TEMPERATURE RANKINGS

SEASONAL MINIMUM AVERAGE TEMPERATURES °C

WINTER (DJF)		SPRING (MAM)		SUMMER (JJA)		AUTUMN (SON)	
2006	-13.2	1993	0.3	2006	12.5	2009	1.3
1998	-13.4	1987	-0.2	2003	12.5	2005	0.4
1987	-13.6	1977	-0.5	1988	12.3	2008	0.1
1992	-14.9	1999	-0.5	1970	12.3	1998	0.1
1964	-15.0	1985	-0.7	2002	12.2	1981	0.0
2002	-15.5	1994	-0.8	1991	12.2	2001	-0.1
1983	-15.6	1981	-1.0	2001	11.7	1967	-0.2
2000	-15.8	1992	-1.0	2007	11.7	1968	-0.2
2004	-16.7	2006	-1.0	1989	11.6	1997	-0.3
1999	-16.8	1988	-1.0	1998	11.6	1987	-0.3
2007	-17.0	1986	-1.1	1997	11.5	2004	-0.4
1981	-17.1	2000	-1.1	2008	11.3	1994	-0.5
1995	-17.2	2001	-1.2	1984	11.2	1999	-0.6
1986	-17.3	2007	-1.3	1996	11.2	1992	-0.7
2003	-17.5	2005	-1.4	1983	11.2	1980	-0.9
1988	-17.8	1990	-1.5	1964	11.0	1983	-1.0
1976	-17.8	1973	-1.7	2005	11.0	1970	-1.1
1984	-17.8	1978	-1.7	1972	11.0	2007	-1.1
2005	-17.8	1991	-2.0	2000	11.0	1964	-1.4
1975	-18.5	1968	-2.0	1981	10.9	1988	-1.4
1970	-18.7	1998	-2.0	1995	10.8	1979	-1.4
1977	-18.8	1984	-2.2	1990	10.7	2000	-1.7
1989	-18.9	2003	-2.3	1999	10.7	1989	-1.8
2001	-19.0	1972	-2.4	1987	10.6	1969	-1.9
1990	-19.1	2004	-2.5	1994	10.6	1971	-2.1
1991	-19.3	1980	-2.6	1965	10.5	2002	-2.2
2008	-19.5	2008	-3.2	1976	10.5	2003	-2.2
1980	-19.6	1976	-3.3	1971	10.3	1977	-2.4
1968	-20.0	1983	-3.7	2009	10.3	1974	-2.4
1973	-20.3	1969	-3.8	1973	10.0	1975	-2.5
1993	-20.5	1995	-3.8	1979	10.0	1993	-2.5
1994	-20.8	1966	-3.9	1966	9.9	1995	-2.6
1967	-21.1	1964	-3.9	1993	9.9	1972	-2.7
1997	-21.3	1971	-4.0	1975	9.8	2006	-2.8
2009	-21.4	1997	-4.3	2004	9.7	1978	-2.9
1996	-21.9	1982	-4.3	1978	9.7	1986	-3.1
1974	-22.6	1989	-4.3	1980	9.6	1990	-3.4
1985	-22.9	1996	-4.9	1982	9.6	1976	-3.6
1971	-23.1	1970	-5.0	1986	9.6	1982	-3.7
1982	-23.6	2009	-5.6	1974	9.6	1991	-3.7
1966	-23.6	1965	-5.8	1967	9.5	1984	-3.8
1969	-24.0	1979	-6.1	1969	9.4	1966	-4.3
1965	-24.0	1974	-6.5	1968	9.2	1996	-4.3
1978	-24.5	1975	-6.5	1992	8.8	1965	-4.4
1972	-25.0	1967	-6.9	1977	8.8	1973	-4.6
1979	-25.2	2002	-7.6	1985	8.2	1985	-6.0

SEASONAL MEAN AVERAGE TEMPERATURES °C

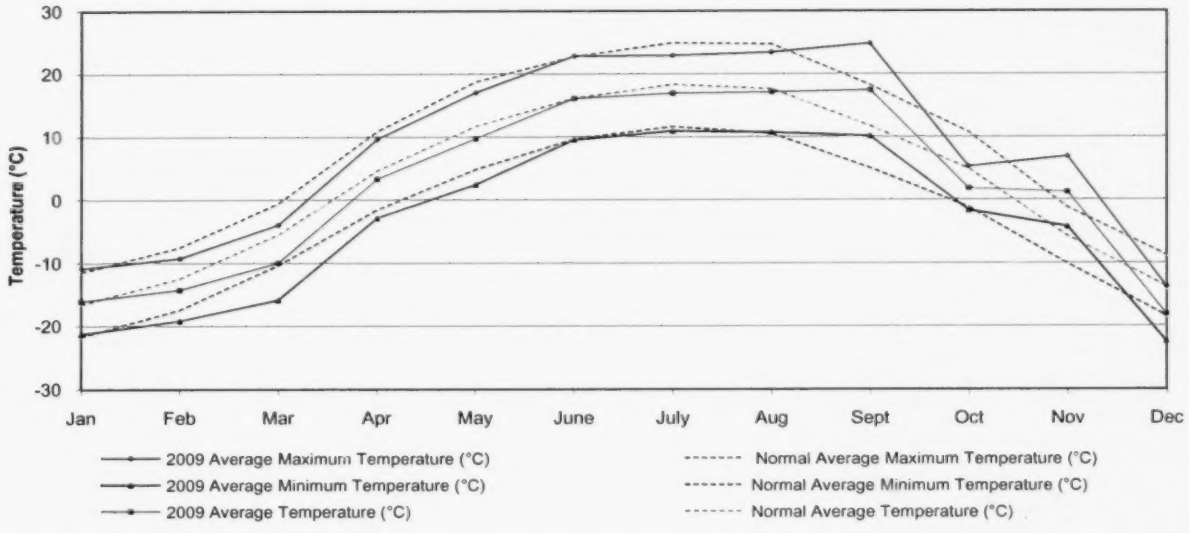
WINTER (DJF)		SPRING (MAM)		SUMMER (JJA)		AUTUMN (SON)	
1987	-8.6	1987	6.2	2003	19.4	2009	6.7
2006	-8.9	1977	6.2	1988	19.2	1987	6.4
1998	-9.1	1993	5.8	2001	19.1	2008	5.9
1992	-10.3	1988	5.8	1970	19.1	2001	5.8
2000	-10.6	1981	5.6	2006	19.1	2005	5.7
2002	-10.8	1994	5.4	2002	18.8	1994	5.7
1964	-10.8	2001	5.4	1984	18.7	1981	5.5
1983	-11.4	1986	5.0	1998	18.6	1999	5.4
2004	-12.0	1998	5.0	1997	18.6	1997	5.4
1981	-12.3	1992	4.9	1991	18.5	1998	5.3
1986	-12.3	2000	4.9	1989	18.5	1967	5.1
2007	-12.4	1999	4.8	1983	18.1	2004	5.0
1999	-12.4	1985	4.7	1981	18.1	1980	5.0
1988	-12.5	2006	4.5	2007	18.1	1968	4.8
1976	-12.6	2007	4.4	1996	18.1	1979	4.6
1995	-12.7	1980	4.4	2008	17.9	1988	4.4
2003	-12.7	1991	4.3	1964	17.8	2007	4.4
2005	-12.9	2005	4.3	1965	17.7	2000	4.3
1984	-13.0	1990	4.3	1972	17.5	1970	4.2
1977	-13.1	1973	4.1	2000	17.4	1974	4.1
1975	-13.3	1978	4.0	1990	17.4	1983	4.1
1990	-13.7	1968	4.0	1965	17.4	1992	4.1
1989	-13.8	1984	4.0	1987	17.3	1989	4.0
1991	-14.0	2004	3.8	1979	17.3	1975	3.8
1970	-14.0	2003	3.6	1976	17.2	1964	3.7
2001	-14.2	1976	3.5	1994	17.1	1976	3.6
1980	-14.6	1972	3.4	1978	17.0	2003	3.6
2008	-14.8	2008	2.9	1971	17.0	1971	3.4
1968	-15.0	1971	2.3	1973	17.0	1977	3.2
1973	-15.4	1969	2.2	1999	16.9	1990	3.2
1993	-16.0	1995	2.2	1967	16.9	1969	3.1
1967	-16.1	1964	2.2	2005	16.8	1995	3.0
1997	-16.2	1966	2.1	1969	16.7	1978	2.9
1994	-16.5	1989	2.0	1986	16.6	1993	2.9
2009	-16.6	1997	1.7	2009	16.6	2002	2.8
1996	-17.1	1983	1.6	1980	16.6	2006	2.4
1985	-17.3	1982	1.2	1975	16.5	1982	2.3
1974	-17.6	2009	0.9	1966	16.4	1966	2.2
1971	-18.3	1996	0.7	1982	16.2	1986	2.1
1966	-18.4	1970	0.5	1974	16.0	1972	1.9
1982	-18.5	1965	-0.1	1977	15.9	1991	1.6
1965	-19.4	1979	-0.7	2004	15.7	1965	1.5
1978	-19.5	1974	-0.9	1992	15.6	1973	1.3
1969	-19.5	2002	-0.9	1968	15.6	1984	0.9
1972	-20.0	1975	-1.0	1993	15.5	1996	0.9
1979	-20.4	1967	-1.3	1985	15.3	1985	-0.8

TEMPERATURE

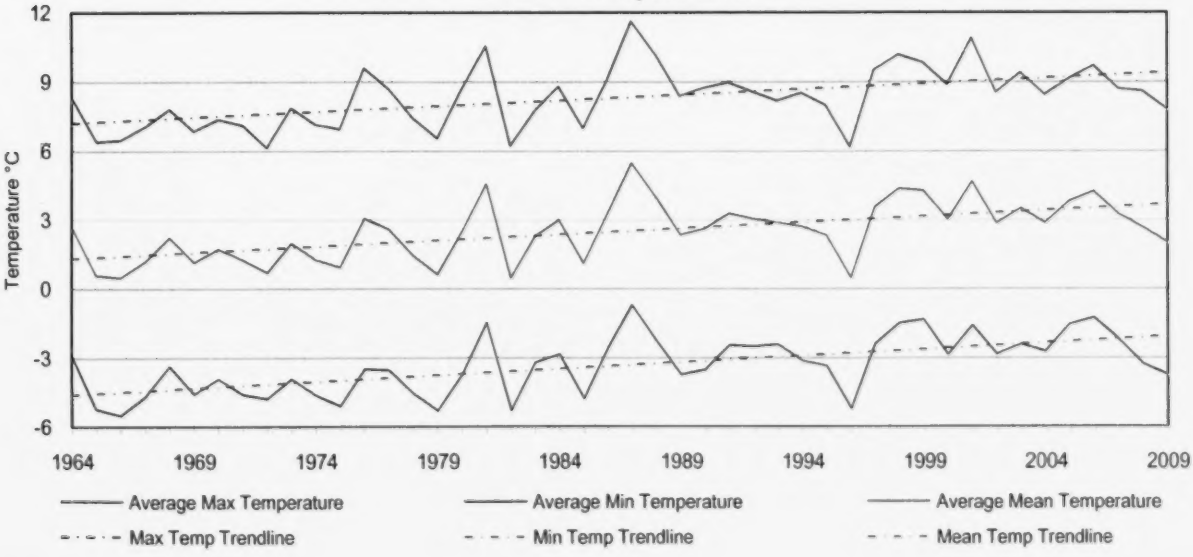
MONTH	AVERAGE MAXIMUM TEMPERATURE (°C)		AVERAGE MINIMUM TEMPERATURE (°C)		AVERAGE TEMPERATURE (°C)		EXTREME VALUES TEMPERATURE (°C)		EXTREME VALUES FOR SASKATOON STATIONS	
	2009	Normal	2009	Normal	2009	Normal	Max/Date	Min/Date	Max/Date	Min/Date
January	-11.0	-11.6	-21.4	-21.8	-16.2	-16.7	5.3/18	-37.4/04	11.0/1980/23$_{SWT}$	-48.9/1893/31$_{SM}$
February	-9.4	-7.7	-19.3	-17.6	-14.4	-12.6	3.1/04, 08	-32.6/26	12.8/1931/19$_{SE}$	-50.0/1893/01$_{SM}$
March	-4.1	-0.7	-16.0	-10.5	-10.1	-5.6	5.5/04	-33.4/11	22.8/1910/23$_{SE}$	-43.3/1897/14$_{SM}$
April	9.5	10.7	-3.0	-1.7	3.2	4.5	20.3/13	-10.5/01	33.3/1952/28$_{SA\ US}$	-30.5/1979/01$_{SWT}$
May	16.9	18.6	2.3	4.7	9.6	11.6	31.3/30	-5.4/07	37.2/1936/27$_{SE}$	-12.8/1907/06$_{SE}$
June	22.7	22.6	9.4	9.5	16.0	16.0	33.2/14	-0.5/05	41.5/1988/06$_{S2}$	-3.9/1917/02$_{US}$
July	22.8	24.8	10.8	11.5	16.8	18.2	31.4/18	4.8/12	40.0/1919,1941,1946$_{SE\ SA\ US}$	-0.6/1918/25$_{SE}$
August	23.3	24.6	10.6	10.4	17.0	17.5	30.9/10	6.2/05	39.7/1998/06$_{SRC}$	-2.8/1901/23SM&1976/28$_{SRC}$
September	24.7	18.1	10.0	4.9	17.3	11.6	34.6/19	1.2/28	35.6/1978/04$_{SRC}$	-11.1/1908/28$_{SE}$
October	5.1	10.6	-1.8	-1.3	1.7	4.8	16.9/17	-8.6/09	32.2/1943/05$_{SA\ US}$	-25.6/1919/26$_{SE\ US}$
November	6.7	-1.4	-4.4	-10.3	1.1	-5.9	16.8/06	-10.5/29	21.7/1903/03$_{SE}$	-39.4/1893/30$_{SM}$
December	-14.0	-9.0	-22.6	-18.6	-18.3	-13.9	-0.6/01	-33.9/13	14.4/1939/05$_{SE}$	-43.9/1892/22$_{SM}$
Average	7.8	8.3	-3.8	-3.4	2.0	2.5				

SE = Saskatoon Eby 1901-1942
US = University of Saskatchewan 1915-1964
SWT = Saskatoon Water Treatment Plant 1974 -
SRC = Saskatchewan Research Council 1963-

SA = Saskatoon Diefenbaker Int'l Airport 1942-
S2= Saskatoon 2 1977-1990
SM = Saskatoon stations circa 1889 - 1901(RNWMP *etal*)



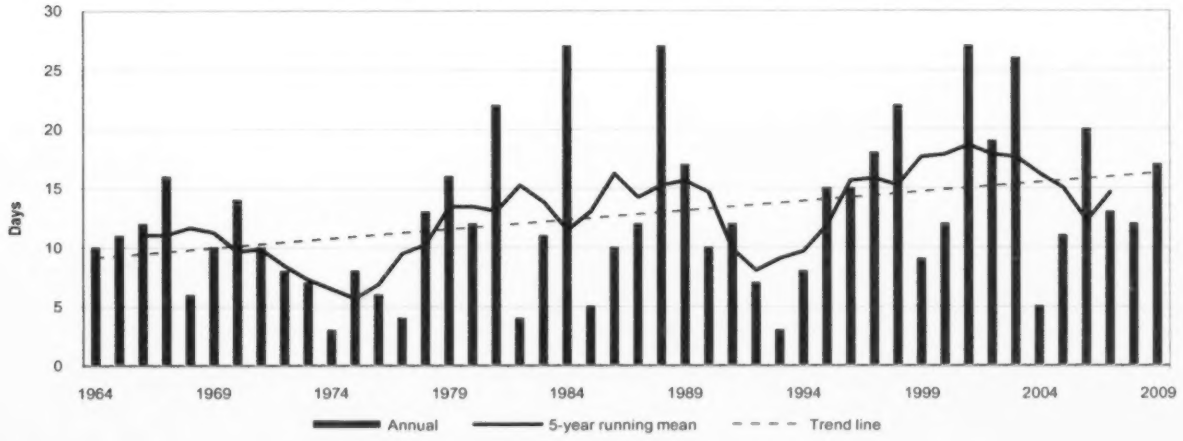
Annual Temperatures



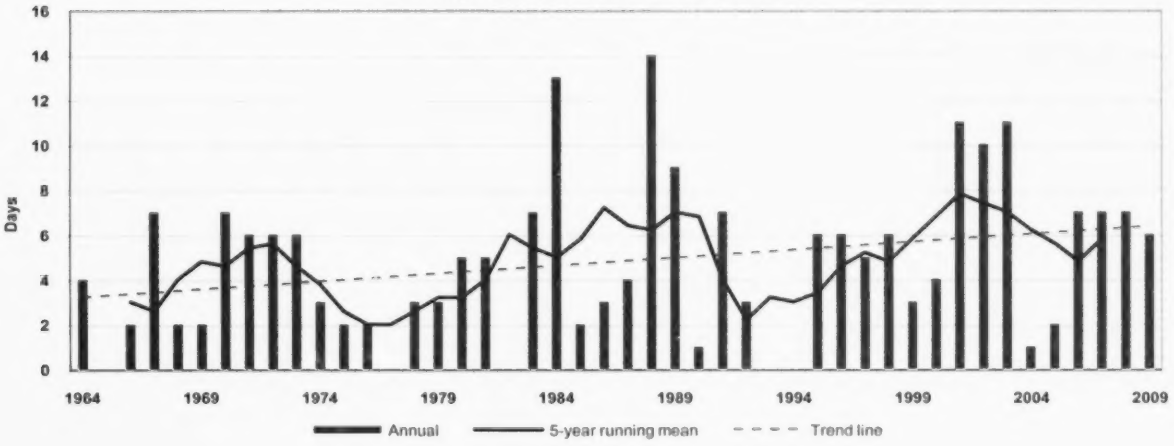
SEASONAL TEMPERATURES for 1964 to 2009

ANNUAL DAYS WITH TEMPERATURES GREATER THAN A SET POINT

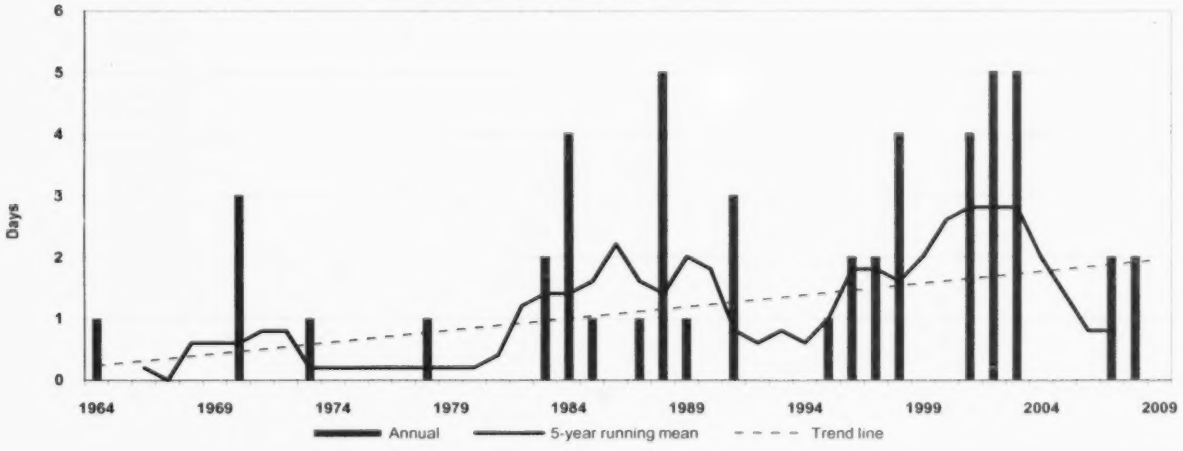
Temperatures 30°C or Greater



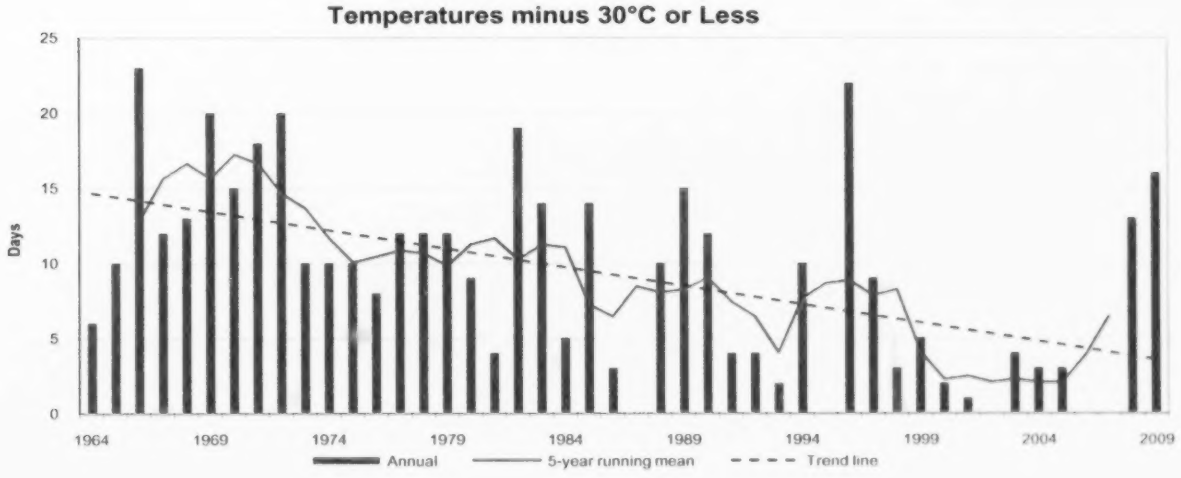
Temperatures 32°C or Greater

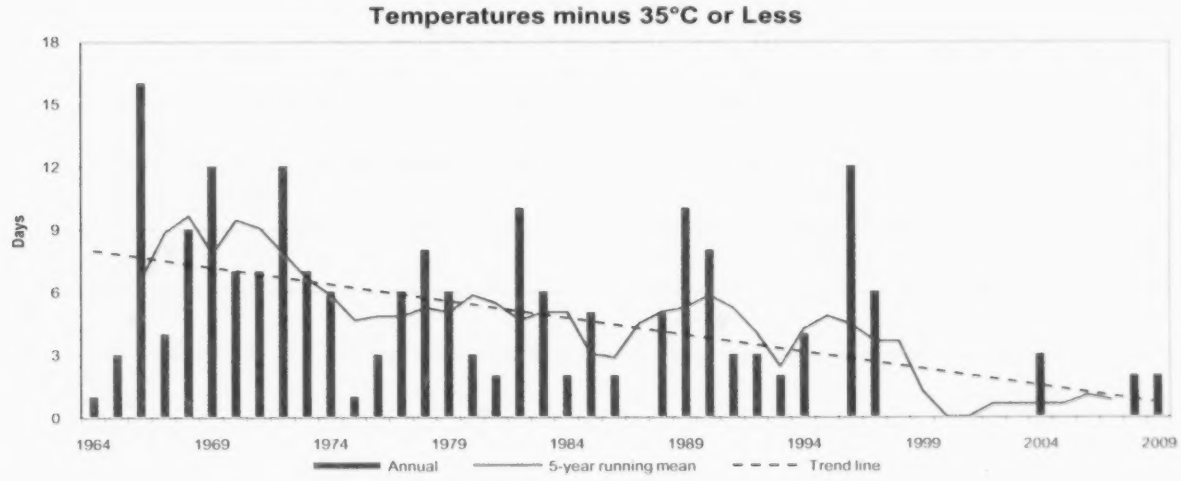


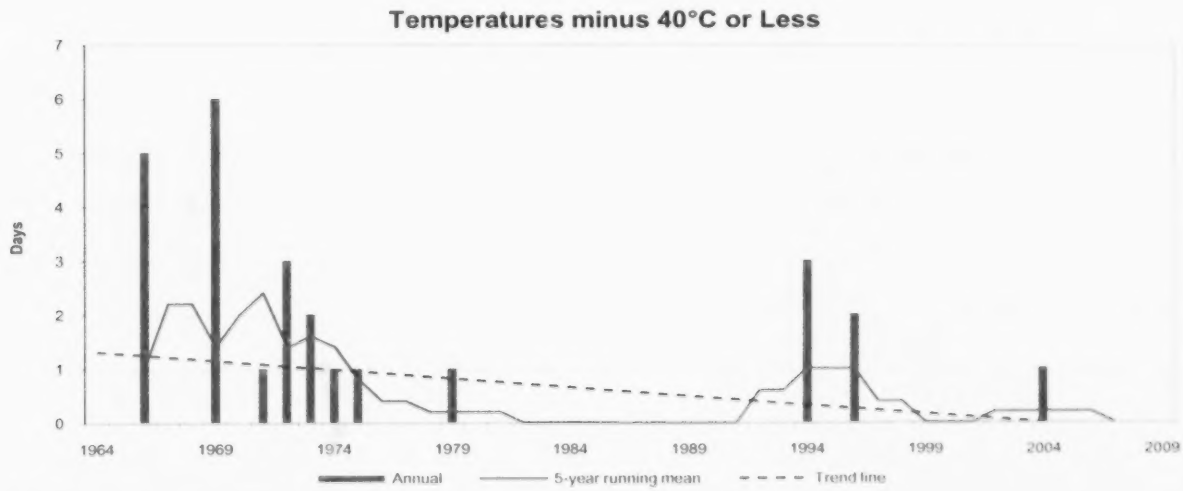
Temperatures 35°C or Greater



ANNUAL DAYS WITH TEMPERATURES LESS THAN A SET POINT

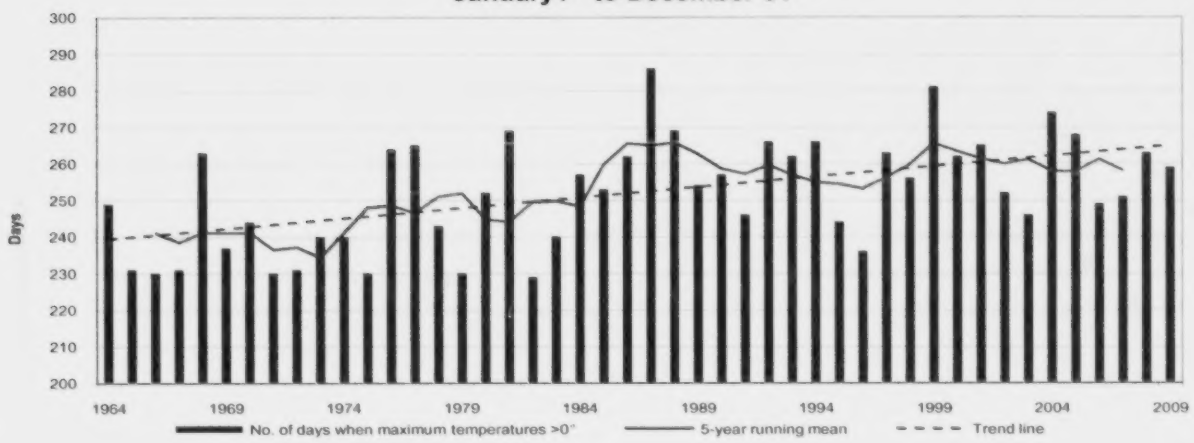




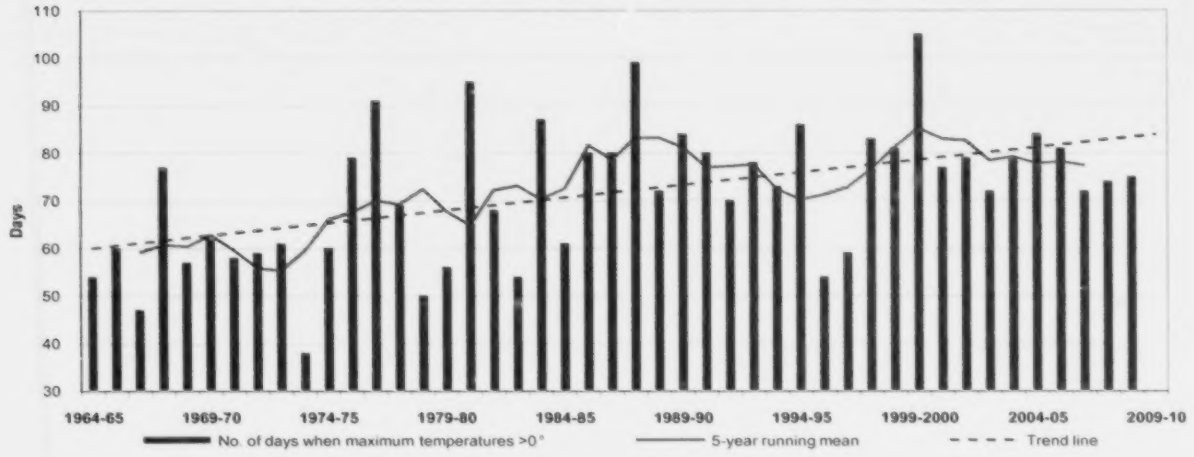


ANNUAL DAYS WITH TEMPERATURES GREATER THAN 0°C (THAW DAYS)

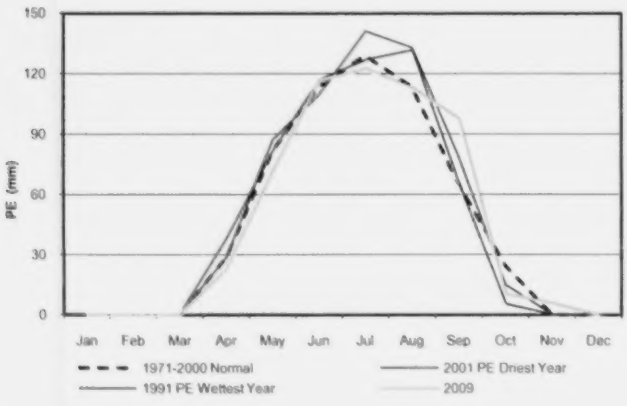
January1st to December 31st



October to March (Cold Season)



POTENTIAL EVAPOTRANSPIRATION (PE) using the Thornthwaite Method[1]

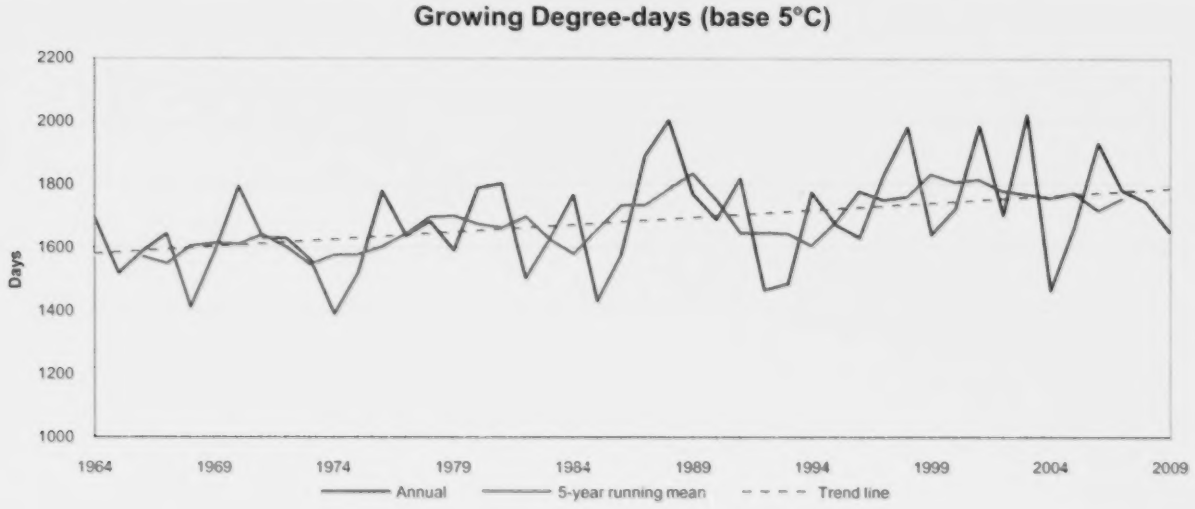


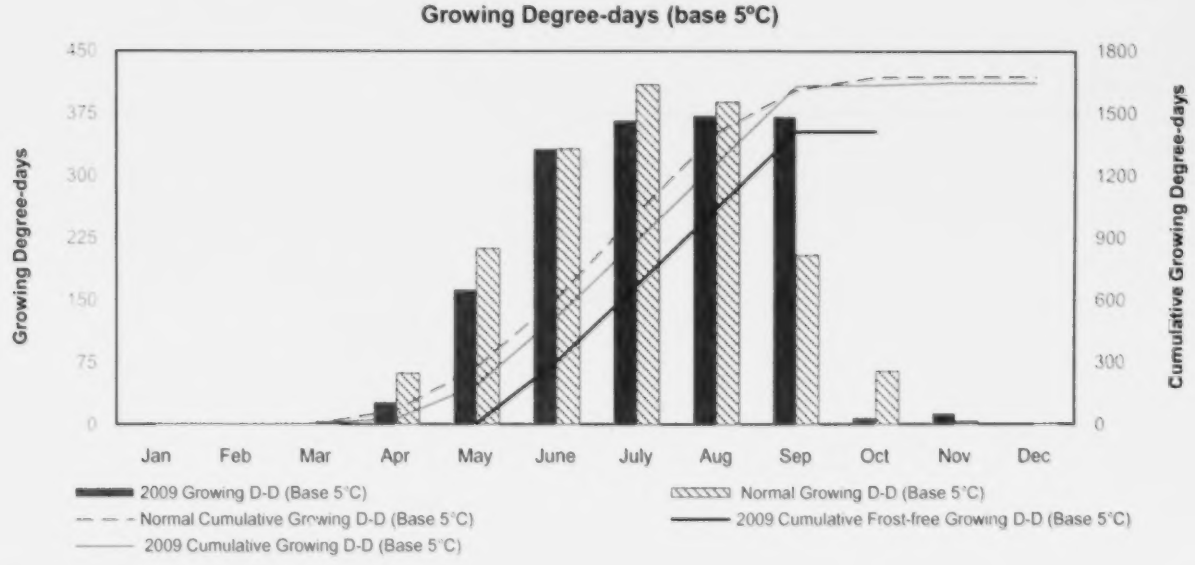
MONTH	PE (mm) 2009	PE (mm) 1991 WettestYear	PE (mm) 2001 Driest Year	PE (mm) 1971-2000 Normal
Jan	0 0	0 0	0 0	0 0
Feb	0 0	0 0	0 0	0 0
Mar	0 0	0 0	0 0	0 0
Apr	22 9	37 5	28 5	28 6
May	71 6	81 3	86 8	81 5
June	116 2	116 8	109 3	113 2
July	122 3	126 7	140 6	128 9
Aug	112 8	131 3	132 4	113 3
Sept	97 2	64 8	78 1	64 9
Oct	10 4	5 4	14 8	24 3
Nov	5 8	0 0	0 0	0 0
Dec	0 0	0 0	0 0	0 0
Total	559 2	563 7	590 4	554 6

[1]*Thornthwaite and Mather 1955*

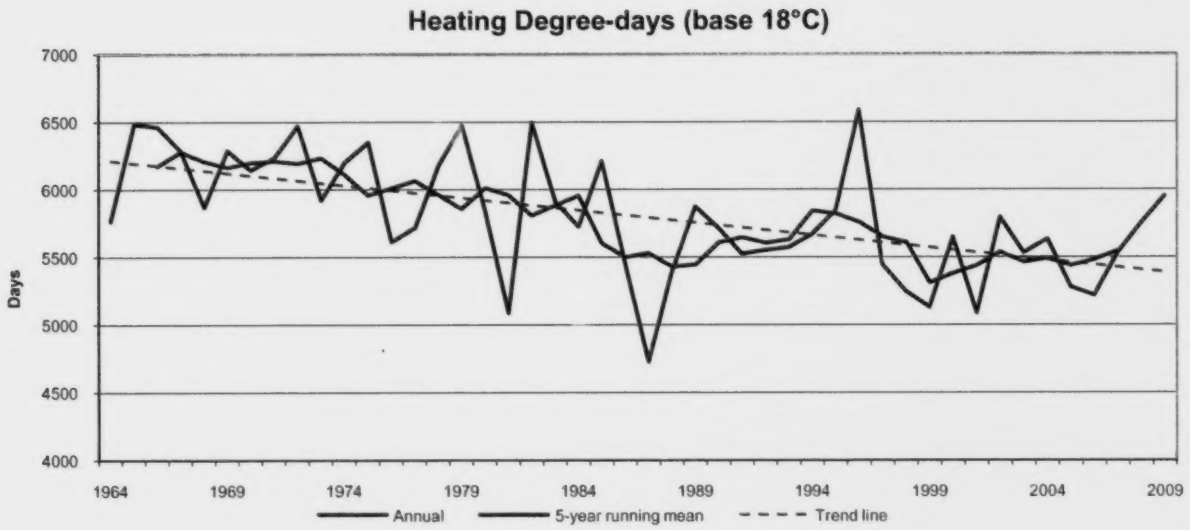
DEGREE-DAYS

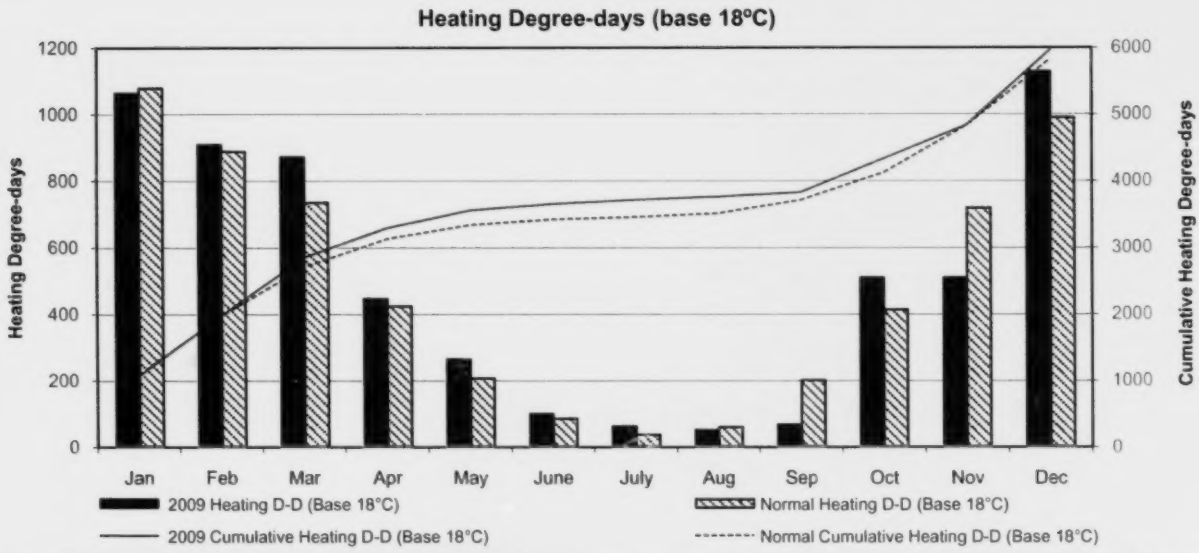
MONTH	GROWING DEGREE-DAYS Base 5°C			HEATING DEGREE-DAYS Base 18°C			COOLING DEGREE-DAYS Base 18°C			EXTREME COOLING DEGREE-DAYS Base 24°C		
	2009	Cumulative	Normal	2009	Cumulative	Normal	2009	Cumulative	Normal	2009	Cumulative	Normal
January	0.0	0.0	0.0	1061.5	1061.5	1076.9	0.0	0.0	0.0	0.0	0.0	0.0
February	0.0	0.0	0.0	906.4	1967.9	1963.1	0.0	0.0	0.0	0.0	0.0	0.0
March	0.0	0.0	2.4	869.6	2837.5	2695.5	0.0	0.0	0.0	0.0	0.0	0.0
April	26.3	26.3	63.7	442.7	3280.2	3116.2	0.0	0.0	0.3	0.0	0.0	0.0
May	161.6	187.9	275.3	261.5	3541.7	3320.6	0.9	0.9	7.7	0.0	0.0	0.2
June	331.4	519.3	606.8	96.4	3638.1	3403.4	37.8	38.7	30.0	0.5	0.5	1.3
July	365.5	884.8	1015.2	59.2	3697.3	3438.7	21.7	60.4	70.7	0.0	0.5	2.8
August	371.4	1256.2	1403.0	48.2	3745.5	3496.4	16.6	77.0	113.2	0.0	0.5	5.2
September	370.3	1626.5	1606.5	65.0	3810.5	3695.3	45.3	122.3	119.0	1.6	2.1	5.3
October	7.4	1633.9	1670.2	506.5	4317.0	4105.5	0.0	122.3	119.1	0.0	2.1	5.3
November	12.4	1646.3	1672.8	505.8	4822.8	4821.3	0.0	122.3	119.1	0.0	2.1	5.3
December	0.0	1646.3	1672.9	1125.6	5948.4	5809.0	0.0	122.3	119.1	0.0	2.1	5.3





DEGREE-DAYS

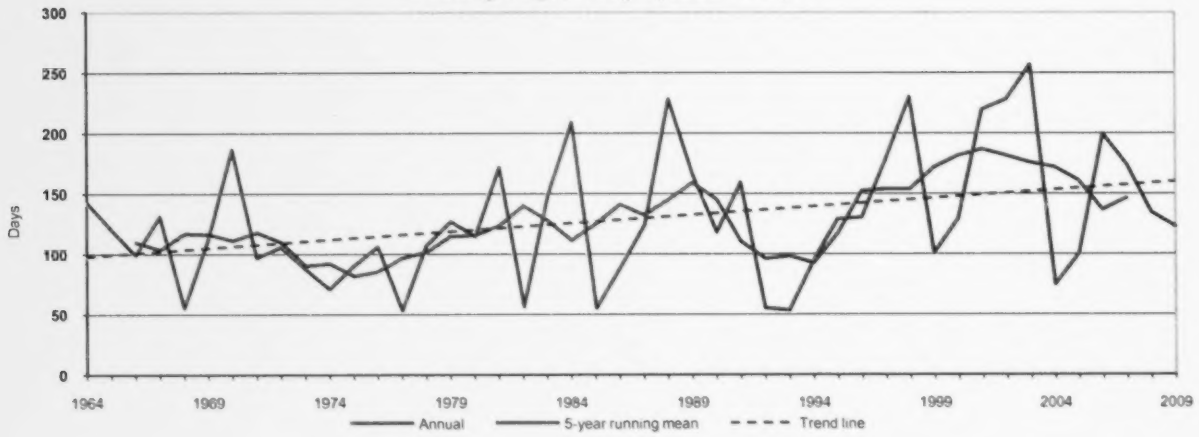




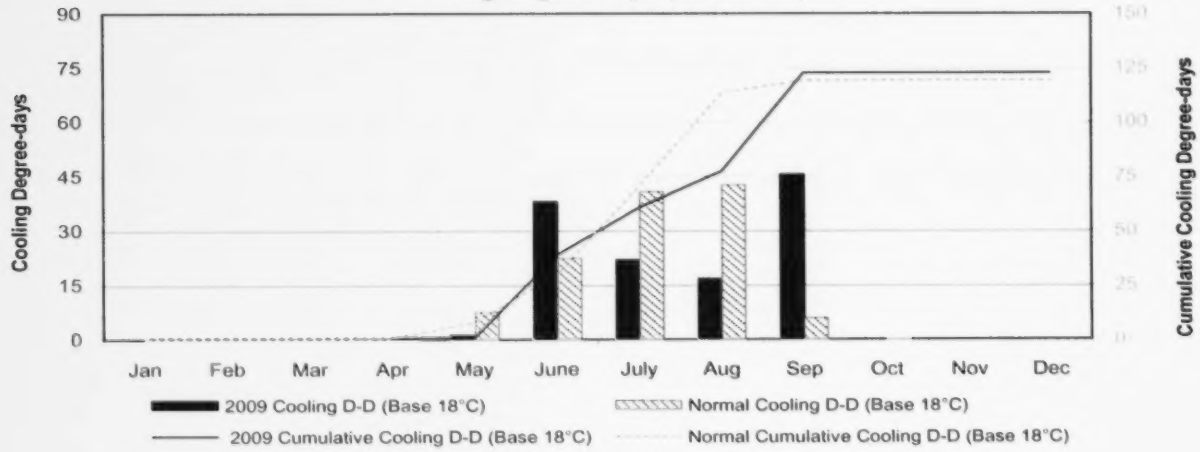
Visitors at the Climate Station *photo credit: CR Beaulieu*

DEGREE-DAYS

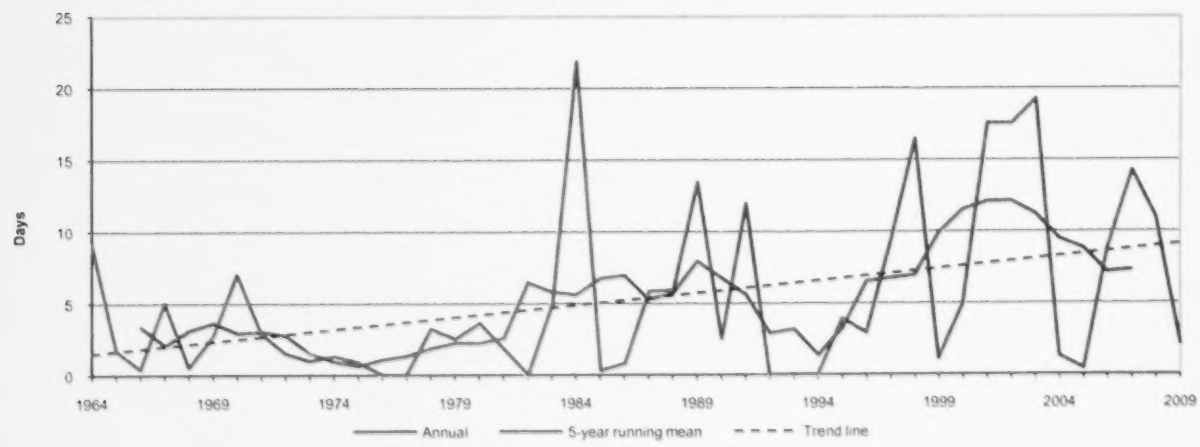
Cooling Degree-days (base 18°C)



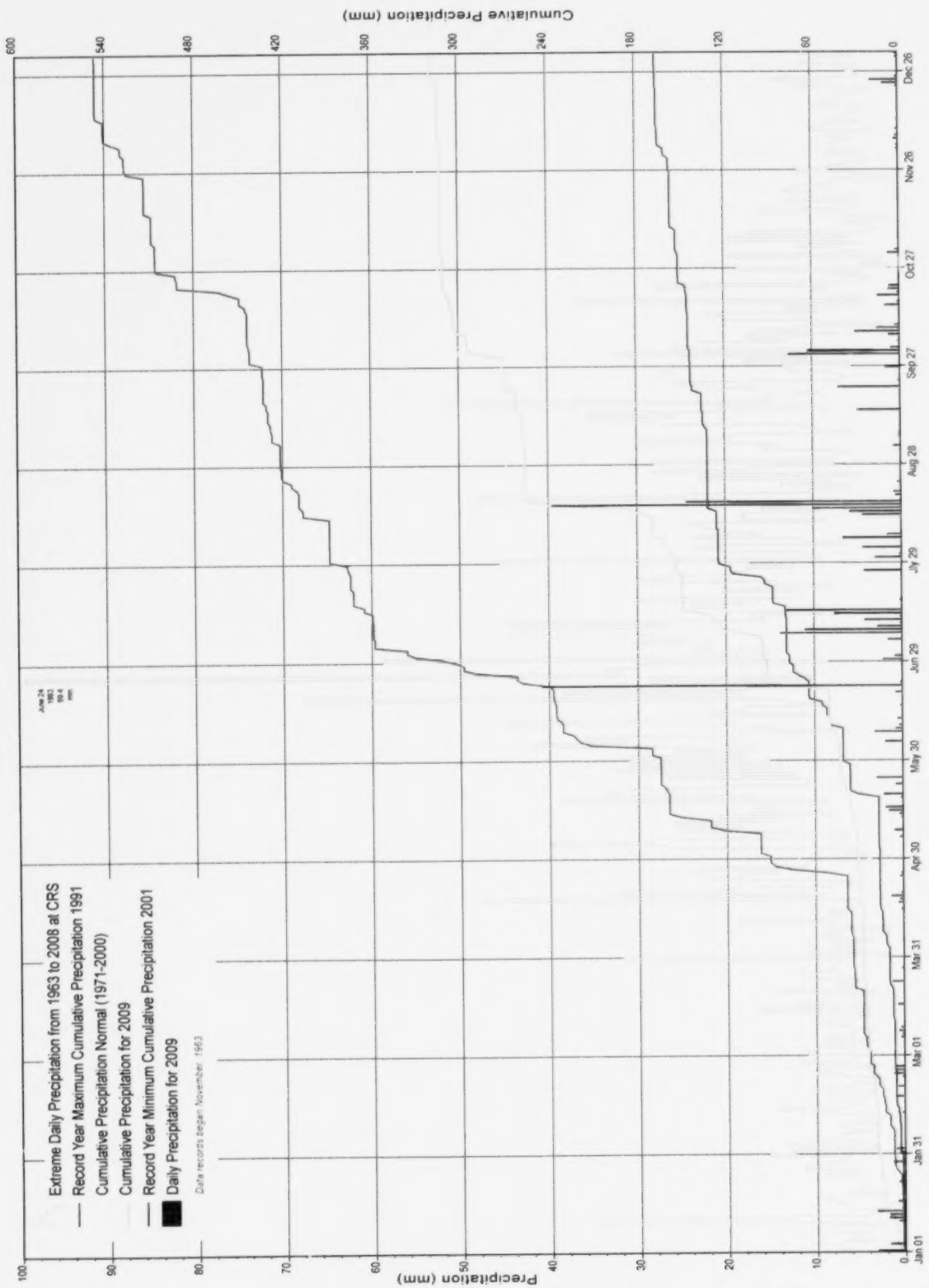
Cooling Degree-days (base 18°C)



Extreme Cooling Degree-days (base 24°C)



DAILY PRECIPITATION



PRECIPITATION RANKINGS

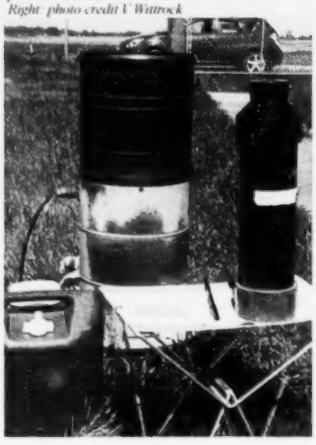
RANKING BY DRY SPELLS/DAYS

Maximum Length of Dry Spell		Total number of Dry Days	
1976	48	2001	282
1993	40	1964	280
2000	40	1984	278
1965	37	1988	275
1980	36	1965	271
1997	36	1966	267
2002	35	1986	267
1964	31	1997	267
1984	30	1987	266
2009	30	1967	265
1966	28	1994	264
1974	28	1968	260
1968	27	1990	260
2004	25	1998	259
1972	23	1985	258
1973	23	1993	258
1996	23	1995	258
1977	22	1999	258
1987	22	2002	258
1978	21	1996	256
1982	21	2003	255
2001	21	1981	252
1969	20	1976	251
1986	20	1992	250
1999	20	2000	248
1967	19	2009	246
1981	19	2008	245
1988	19	1980	244
2008	19	1971	243
1994	18	1989	241
1995	18	1970	240
2003	18	1979	239
1975	17	1972	238
1979	17	1977	238
1985	17	2007	237
1998	17	1975	235
2005	17	1991	234
1983	16	1983	233
1990	16	2005	231
1991	16	1974	229
1992	16	1982	229
1971	15	2006	227
2007	15	1978	224
1989	14	1969	218
1970	13	2004	208
2006	13	1973	200

MONTHLY RANKING BY DRIEST MONTH

AMOUNT (mm)		AMOUNT % OF NORMAL	
Nov	0.4	Nov	2.7
Apr	3.4	Apr	14.4
Mar	3.8	Mar	23.5
Feb	6.2	May	26.6
Dec	7.2	Dec	39.3
May	11.8	Feb	46.6
Jan	17.6	Jun	87.4
Sept	27.4	Sept	93.2
Oct	28.7	Jan	96.7
Jun	52.0	Jul	106.7
Jul	62.0	Oct	175.0
Aug	98.8	Aug	272.9

Above: photo credit: V Wittrock
Below: Tipping Bucket calibration, photo credit: CR Beaulieu
Right: photo credit V Wittrock



PRECIPITATION

2009 PRECIPITATION RECORDS

TYPE	DATE	NEW RECORD	OLD RECORD/year
Greatest Daily Precipitation (mm)	January 13	3.2	2.5/1974
	June 21	40.8	13.7/1979
	July 13	7.6	7.2/2003
	August 15	39.6	11.1/1988
	August 16	24.4	19.4/1999
	October 1	10.4	3.0/1968
Least Monthly Precipitation (mm)	November	0.4	0.7/2004
Driest Season (mm)	Spring(MAM)	19.0	20.3/2002
Fewest number of Days per Month with any Precipitation	November	1	2/1968, 1974, 1976, 1997
Fewest number of Days with Monthly Precipitation >5 mm	June	1	1/1964/1977/1985/1987
Most number of Days with Monthly Precipitation >10 mm	August	3	3/1967, 1968, 1982, 1988

EXTREME PRECIPITATION EVENTS (mm)*

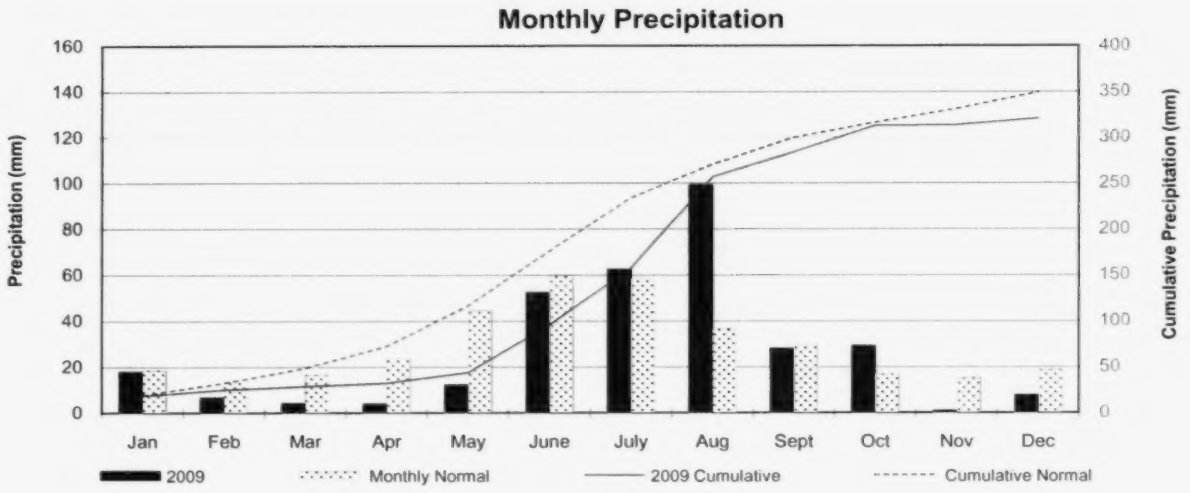
PERIOD	DATE	AMOUNT
0.5 hour	June 21	10.0
0.5 hour	August 15	6.0
1 hour	June 21	13.6
1 hour	August 15	10.0
2 hours	June 21	17.6
2 hours	August 15	15.4
6 hours	June 21	30.4
6 hours	August 15	30.0
12 hours	June 21	40.8
12 hours	August 15	39.2
Daily	June 21	40.8
Daily	August 15	39.6
More than one day	August 11 - August 16	84.4
More than one day	July 7 - July 14	52.8
Longest wet spell	July 7 - July 14	8 days / 52.8 mm
Longest wet spell	January 9 - January 14	6 days / 8.1 mm
Longest wet spell	August 11 - August 16	6 days / 84.4 mm
Longest dry spell	November 2 - December 1	30 days

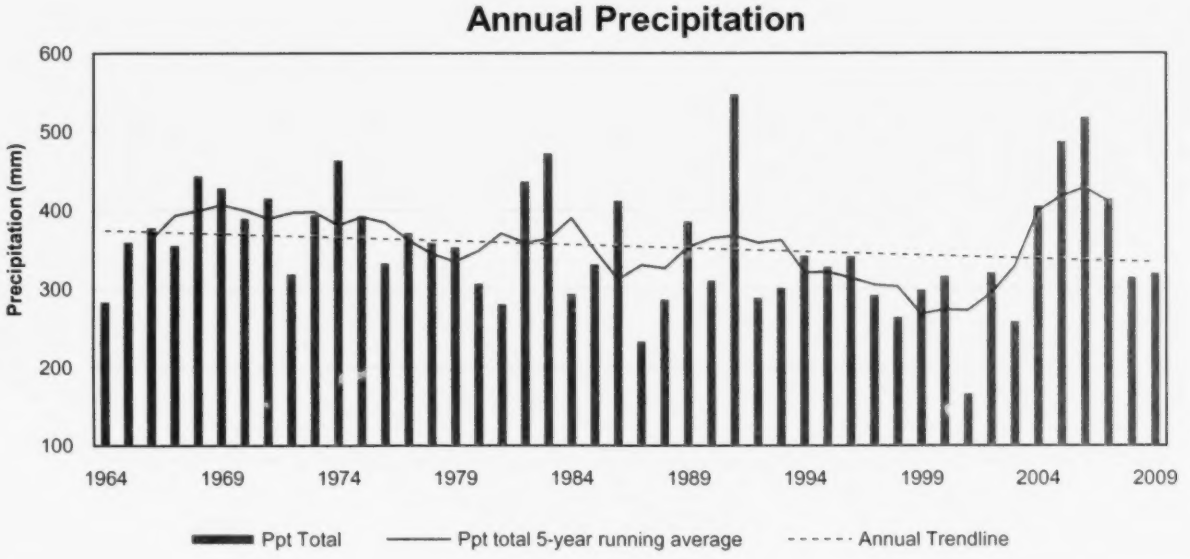
*recorded by tipping bucket April 16th to October 7th otherwise by the Belfort weigh gauge

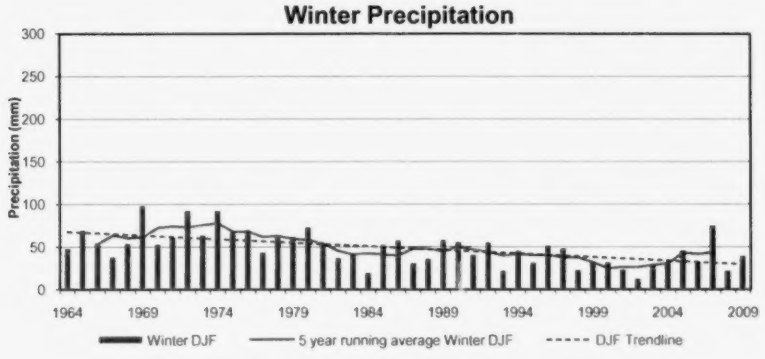
PRECIPITATION

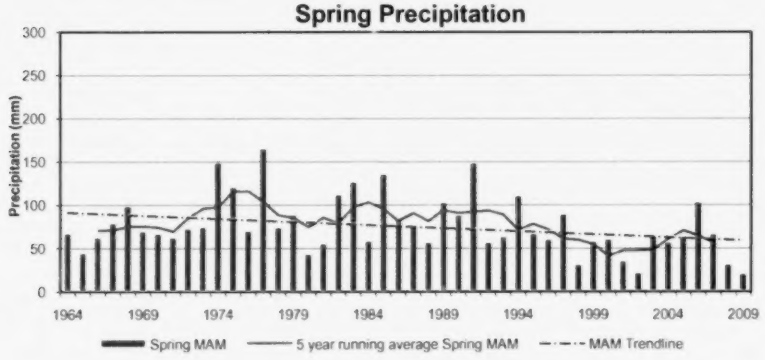
MONTH	MONTHLY PRECIPITATION (mm)				EXTREME VALUES (mm)		
	2009	NORMAL	CUMULATIVE 2009	% OF CUMULATIVE NORMAL	CRS Maximum	CRS Minimum	SASKATOON CITY Maximum
January	17.6	18.2	17.6	96.7	48.6/1969	2.6/2001	66.1/1911SE
February	6.2	13.3	23.8	75.6	40.2/1979	2.5/1984	43.7/1924SE
March	3.8	16.2	27.6	57.6	57.1/1967	2.4/1992, 1994, 2008	59.0/1927SE
April	3.4	23.6	31.0	43.5	55.9/1985	2.4/1988, 89	86.1/1955US
May	11.8	44.3	42.8	37.0	145.3/1977	0.2/2002	178.0/1977SWT
June	52.0	59.5	94.8	54.1	171.0/2005	13.0/1985	186.8/1942S
July	62.0	58.0	156.8	67.3	125.9/1971	13.0/1984	162.9/1928SE
August	98.8	36.2	255.6	94.9	105.2/2007	7.0/2001	178.9/1954NRC
September	27.4	29.4	283.0	94.7	128.4/2006	0.8/1995	128.4/2006SRC
October	28.7	16.4	311.7	98.9	69.8/1969	0.0/2000	69.8/1969SRC
November	0.4	14.8	312.1	94.6	48.2/1973	0.4/2009	57.3/1940SE
December	7.2	18.3	319.3	91.7	43.0/1977	1.2/1997	59.2/1956SA
Total	319.3	348.2					

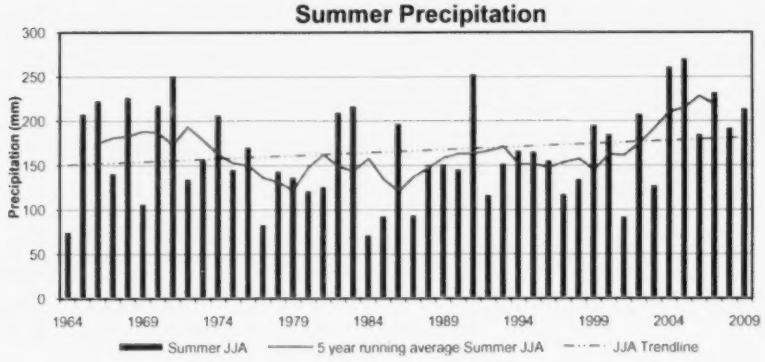
SE	Saskatoon Eby	1901-1942
US	University of Saskatchewan	1915-1964
SWT	S'toon Water Treatment Plant	1974-
S	Saskatoon	1941-1942
NRC	National Res. Council	1952-1966
SRC	Sask. Research Council	1963-
SA	S'toon Diefenbaker Intl. Airport	1942-

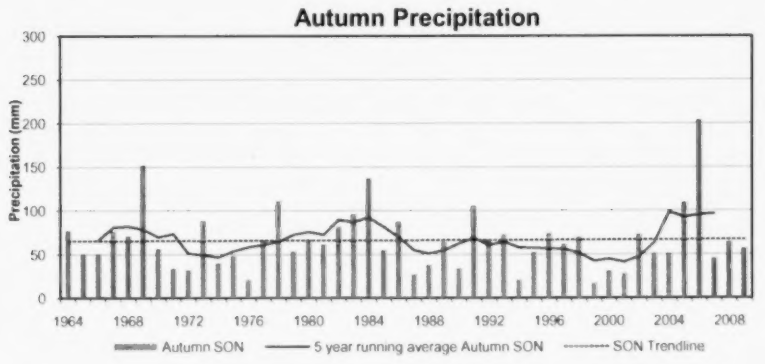





Winter Precipitation
Precipitation (mm)
300
250
200
150
100
50
0
1964
1969
1974
1979
1984
1989
1994
1999
2004
2009
Winter DJF
5 year running average Winter DJF
DJF Trendline

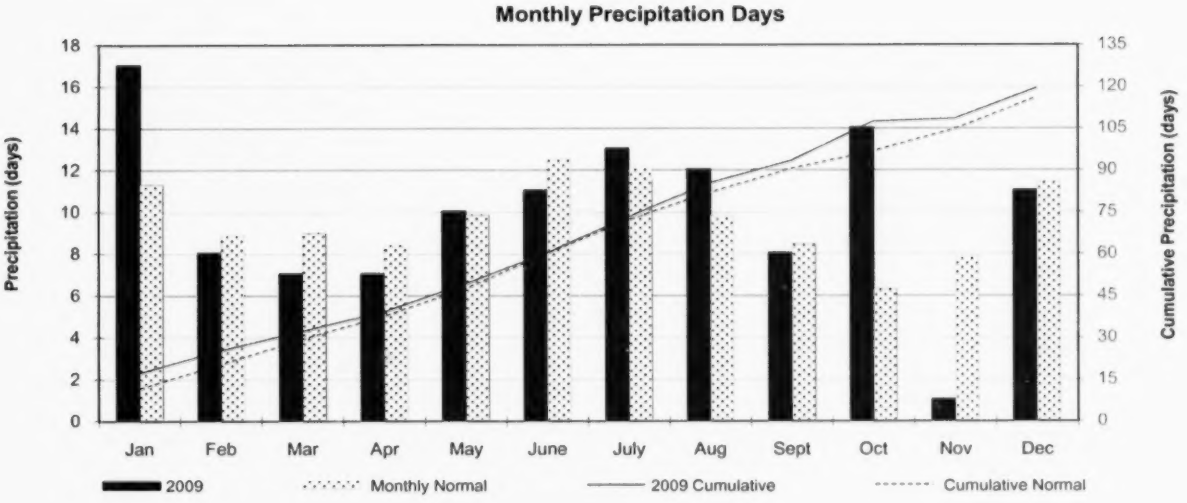

Spring Precipitation
Precipitation (mm)
300
250
200
150
100
50
0
1964
1969
1974
1979
1984
1989
1994
1999
2004
2009
Spring MAM
5 year running average Spring MAM
MAM Trendline

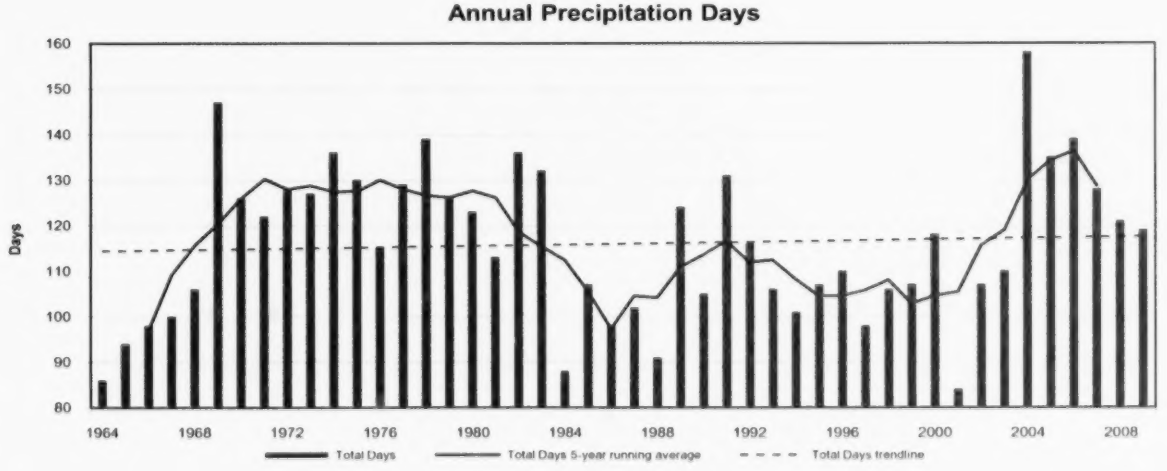

Summer Precipitation
Precipitation (mm)
300
250
200
150
100
50
0
1964
1969
1974
1979
1984
1989
1994
1999
2004
2009
Summer JJA
5 year running average Summer JJA
JJA Trendline

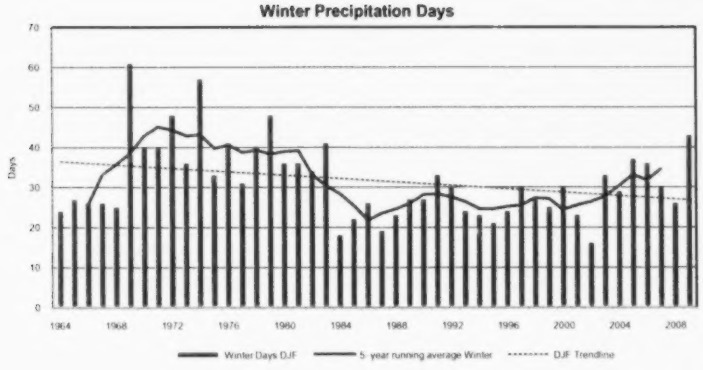

Autumn Precipitation
Precipitation (mm)
300
250
200
150
100
50
0
1964
1968
1972
1976
1980
1984
1988
1992
1996
2000
2004
2008
Autumn SON
5 year running average Autumn SON
SON Trendline

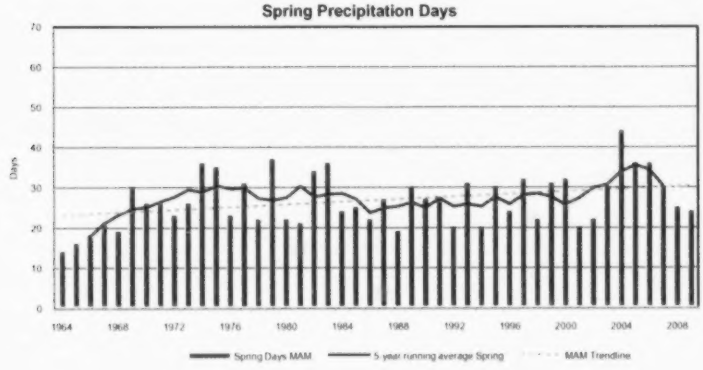
PRECIPITATION

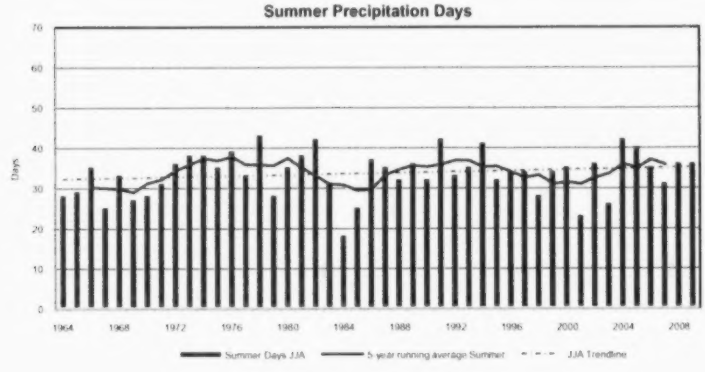
MONTH	MONTHLY PRECIPITATION DAYS			
	2009	NORMAL	CUMULATIVE 2009	% OF CUMULATIVE NORMAL
January	17	11.3	17	150.4
February	8	8.9	25	124.0
March	7	9.0	32	109.8
April	7	8.4	39	104.0
May	10	9.8	49	103.5
June	11	12.5	60	100.3
July	13	12	73	101.6
August	12	9.8	85	104.1
September	8	8.4	93	103.2
October	14	6.3	107	111.0
November	1	7.9	108	103.6
December	11	11.4	119	102.9
Total	119	348.2		

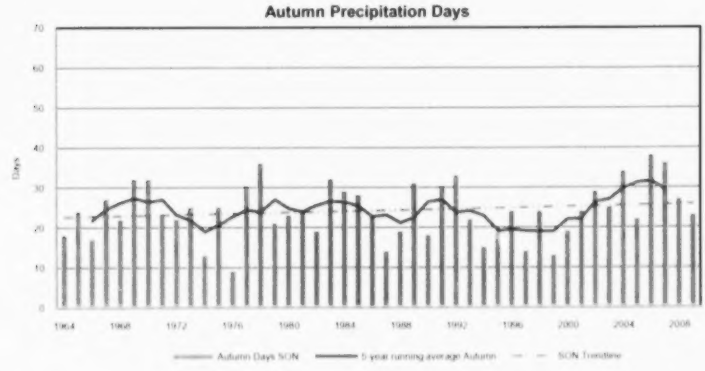





Winter Precipitation Days
Days
Winter Days DJF
5 year running average Winter
DJF Trendline


Spring Precipitation Days
Days
Spring Days MAM
5 year running average Spring
MAM Trendline


Summer Precipitation Days
Days
Summer Days JJA
5 year running average Summer
JJA Trendline


Autumn Precipitation Days
Days
Autumn Days SON
5 year running average Autumn
SON Trendline

PRECIPITATION RANKINGS

ANNUAL RANKING BY DRIEST YEAR (mm)

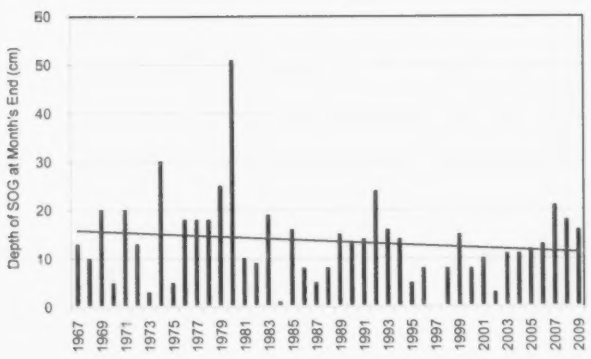
ANNUAL		WINTER (DJF)		SPRING (MAM)		SUMMER (JJA)		AUTUMN (SON)	
2001	165.8	2002	12.1	2009	19.0	1984	70.2	1999	17.2
1987	232.4	1984	19.2	2002	20.3	1964	73.9	1994	21.0
2003	257.7	2008	21.6	1998	29.8	1977	81.9	1976	21.8
1998	263.3	1993	22.0	2008	29.8	2001	91.2	1987	27.4
1981	279.8	1998	22.4	2001	34.0	1985	91.8	2001	28.5
1964	282.7	2001	23.1	1980	42.2	1987	92.6	2007	30.8
1988	285.7	2003	29.2	1965	43.2	1969	105.5	2000	31.2
1992	288.1	2004	29.3	1981	54.3	1992	115.6	1972	32.3
1997	291.4	1987	30.6	2004	55.4	1997	116.4	1990	33.9
1984	293.1	1995	31.3	1992	55.5	1980	120.3	1971	34.2
1999	297.7	1999	31.3	1988	55.6	1981	124.9	1988	38.1
1993	300.0	2000	31.7	1999	56.5	2003	126.2	1974	40.0
1980	305.9	2006	32	1984	57.2	1972	133.3	1975	48.8
1990	309.8	1988	35.9	1996	58.8	1998	133.4	2004	50.0
2008	313.8	1982	37.0	2000	59.2	1979	135.9	1966	50.2
2000	315.4	1967	37.9	1971	61.1	1967	139.9	1965	50.9
1972	317.9	2009	38.8	1966	61.2	1978	142.5	2003	51.2
2009	319.3	1991	40.3	2003	61.8	1975	144.5	1995	52.6
2002	320.0	1983	41.1	2005	62.1	1990	144.5	1979	53.4
1995	327.7	1977	43.1	1993	62.2	1988	148.9	1985	55.2
1985	330.6	1994	45.1	2007	64.7	1989	149.9	1970	56.4
1976	331.8	2005	45.4	1995	65.4	1993	151.0	2009	56.5
1996	340.6	1964	47.9	1970	65.7	1996	154.4	1981	61.4
1994	341.4	1997	48.0	1964	65.8	1973	156.1	1997	61.6
1979	352.0	1996	51.0	1969	68.5	1995	164.4	2008	64.4
1967	354.3	1981	52.2	1976	69.1	1994	165.6	1989	64.5
1978	358.1	1985	52.3	1972	71.6	1976	169.4	1977	65.4
1965	358.8	1970	52.7	1978	72.8	2000	183.8	1992	65.9
1977	370.5	1968	53.8	1973	73.1	2006	183.8	1980	66.6
1966	376.9	1966	54.7	1987	73.6	2008	191.2	1998	70.0
1989	384.8	1992	55.0	1967	78.0	1999	194.2	1968	71.3
1970	388.8	1990	55.6	1986	82.5	1986	196.2	2002	72.8
1975	392.3	1986	57.2	1990	87.2	1974	205.5	1993	73.1
1973	393.3	1989	57.9	1979	87.3	1965	206.6	1996	74.4
2004	404.5	1971	60.4	1997	88.2	2002	206.8	1967	76.8
1986	411.3	1979	61.3	1968	97.6	1982	208.4	1964	77.4
2007	413.9	1978	63.0	1989	101.7	2009	212.9	1982	81.5
1971	414.6	1973	63.2	2006	101.8	1983	215.8	1986	87.2
1969	427.4	1975	67.3	1994	109.4	1970	216.5	1973	88.2
1982	436.2	1965	69.3	1982	110.8	1966	222.0	1983	96.2
1968	443.1	1976	69.5	1975	119.6	1968	225.9	1991	105.4
1974	462.7	1980	73.0	1983	125.2	2007	231.0	2005	109.4
1983	471.6	2007	74.7	1985	134.3	1971	248.8	1978	111.4
2005	486.8	1972	92.2	1991	147.3	1991	251.6	1984	137.0
2006	517.5	1974	92.2	1974	148.0	2004	260.0	1969	151.8
1991	546.9	1969	98.1	1977	164.1	2005	269.4	2006	203.3

ANNUAL RANKING BY DAYS WITH PRECIPITATION

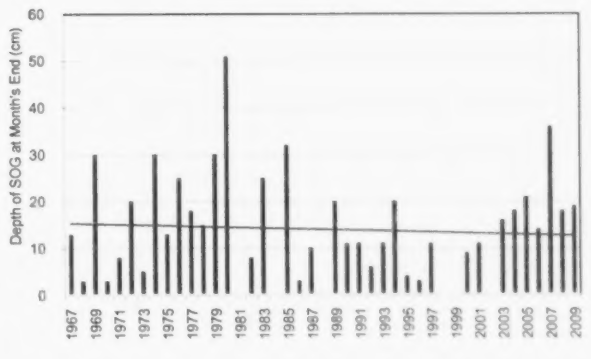
ANNUAL		WINTER (DJF)		SPRING (MAM)		SUMMER (JJA)		AUTUMN (SON)	
2001	84	2002	16	1964	14	1984	18	1976	9
1964	86	1984	18	1965	16	2001	23	1974	13
1984	88	1987	19	1966	18	1967	25	1999	13
1988	91	1995	21	1968	19	1985	25	1987	14
1965	94	1985	22	1988	19	2003	26	1997	14
1966	98	1988	23	1992	20	1969	27	1994	15
1986	98	1994	23	1994	20	1964	28	1966	17
1997	98	2001	23	2001	20	1970	28	1964	18
1967	100	1964	24	1967	21	1979	28	1990	18
1994	101	1993	24	1981	21	1998	28	1982	19
1987	102	1996	24	1978	22	1965	29	1988	19
1990	105	1968	25	1980	22	1971	31	2000	19
1968	106	1999	25	1986	22	1983	31	1995	20
1993	106	1966	26	1998	22	2007	31	1979	21
1998	106	1967	26	2002	22	1988	32	1968	22
1985	107	1986	26	1972	23	1990	32	1972	22
1995	107	2008	26	1976	23	1995	32	1993	22
1999	107	1965	27	1984	24	1968	33	2005	22
2002	107	1989	27	1996	24	1977	33	1971	23
1996	110	1990	27	2009	24	1992	33	1980	23
2003	110	1998	27	1985	25	1996	34	1986	23
1981	113	2004	29	2008	25	1997	34	2009	23
1976	115	1992	30	1970	26	1999	34	1965	24
1992	116	1997	30	1971	26	1966	35	1981	24
2000	118	2000	30	1973	26	1975	35	1996	24
2009	119	2007	30	1987	27	1980	35	1998	24
2008	121	1977	31	1990	27	1987	35	2001	24
1971	122	1975	33	1991	27	1993	35	1973	25
1980	123	1991	33	1969	30	2000	35	1975	25
1989	124	2003	33	1989	30	2006	35	2003	25
1970	126	1982	34	1995	30	1972	36	1967	27
1979	126	1973	36	2003	30	1989	36	2008	27
1973	127	1980	36	2007	30	2002	36	1985	28
1972	128	1981	36	1977	31	2008	36	1984	29
2007	128	2006	36	1993	31	2009	36	2002	29
1977	129	2005	37	1999	31	1986	37	1977	30
1975	130	1970	40	1997	32	1973	38	1991	30
1991	131	1971	40	2000	32	1974	38	1989	31
1983	132	1978	40	1982	34	1981	38	1969	32
2005	135	1976	41	1975	35	1976	39	1970	32
1974	136	1983	41	1974	36	2005	40	1983	32
1982	136	2009	43	1983	36	1994	41	1992	33
1978	139	1972	48	2005	36	1982	42	2004	34
2006	139	1979	48	2006	36	1991	42	1978	36
1969	147	1974	57	1979	37	2004	42	2007	36
2004	158	1969	61	2004	44	1978	43	2006	38

SNOW-ON-THE-GROUND (SOG)

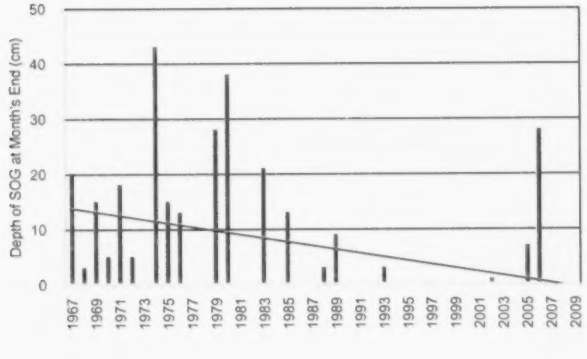
January



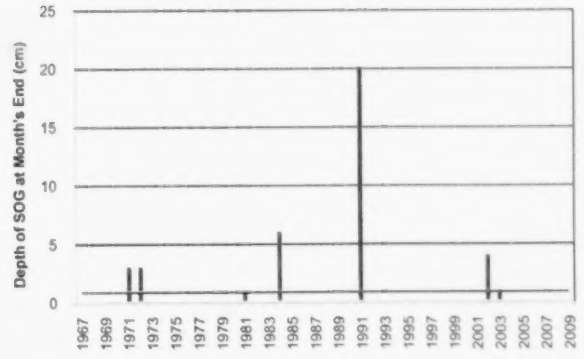
February



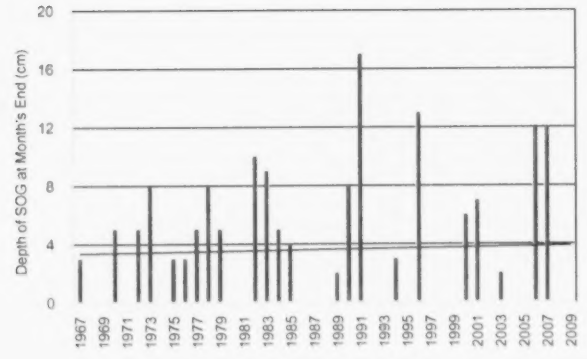
March



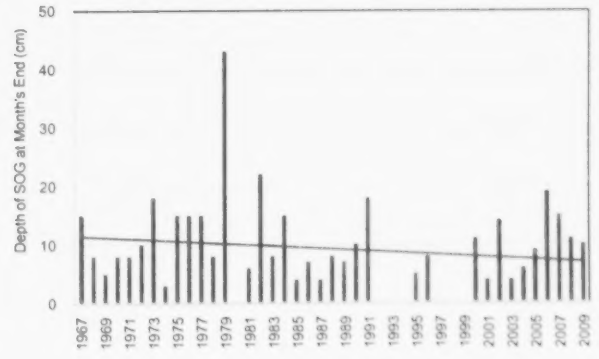
October



November



December



RADIATION

Sunrise/Sunset Tables for Saskatoon, 2009 & 2010[1]

2009	JANUARY		FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER	
Date	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set
1	9:15	17:06	8:46	17:55	7:52	18:47	6:40	19:41	5:36	20:33	4:52	21:18	4:50	21:30	5:28	20:56	6:18	19:53	7:08	18:43	8:02	17:37	8:53	16:58
2	9:15	17:07	8:45	17:57	7:49	18:49	6:38	19:43	5:34	20:34	4:51	21:19	4:51	21:30	5:30	20:55	6:20	19:51	7:10	18:41	8:04	17:35	8:55	16:57
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31	8:48	17:53			6:43	19:40			4:52	21:17			5:27	20:58	6:17	19:55			8:01	17:39			9:15	17:04

2010	JANUARY		FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER	
Date	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set
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31	8:48	17:52			6:43	19:39			4:53	21:17			5:26	20:58	6:16	19:56			8:00	17:40			9:15	17:04

[1]National Research Council, Canada, Hertzberg Institute of Astrophysics

Sunrise/set corresponds to the upper limb of the sun appearing at the horizon

RADIATION

MONTH	BRIGHT SUNSHINE (hrs)				BRIGHT SUNSHINE DAYS		
	2009	NORMAL	% OF NORMAL	% OF POSSIBLE	ANY DAY	DAYS GREATER THAN 1 HOUR	NORMAL FOR ANY DAY
January	120.7	103.3	116.8	46.5	27	18	23.8
February	146.9	132.3	111.0	52.6	24	24	24.2
March	232.3	175.2	132.6	62.8	27	27	27.1
April	275.7	225.2	122.4	65.8	28	27	27.3
May	294.5	267.1	110.3	60.3	30	27	29.5
June	283.4	277.2	102.2	56.7	30	27	28.5
July	288.4	305.7	94.3	57.5	30	28	30.3
August	268.1	280.8	95.5	59.3	29	29	30.1
September	266.4	186.0	143.2	70.4	29	28	27.0
October	69.9	157.9	44.3	21.3	23	20	27.0
November	169.4	98.0	172.9	64.3	28	27	22.2
December	108.8	85.4	127.4	44.9	26	23	22.8
Total	2524.5	2294.1	110.0	56.3	331	305	319.8

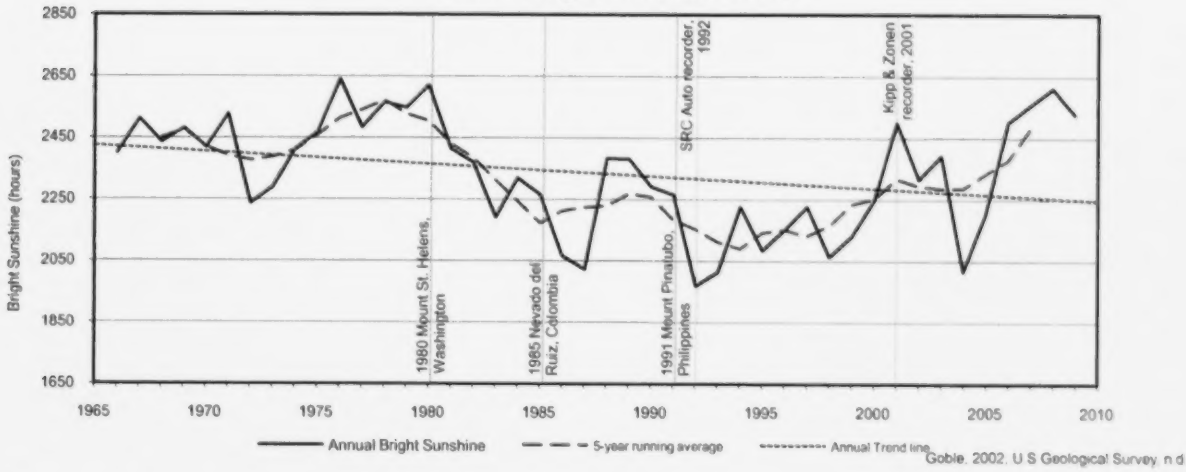
Global and Diffuse Radiation

DATE	JAN		FEB		MAR		APR		MAY		JUN		JULY		AUG		SEPT		OCT		NOV		DEC	
	G	D	G	D	G	D	G	D	G	D	G	D	G	D	G	D	G	D	G	D	G	D	G	D
1	4.0	1.1	6.3	2.4	12.0	3.1	20.2	3.3	22.3	7.9	19.6	9.0	27.4	6.3	21.7	7.4	18.2	3.9	1.7	1.7	7.2	1.6	1.9	1.5
2	1.5	1.5	4.8	4.3	8.0	6.3	20.0	4.3	24.4	4.5	29.2	3.2	24.2	5.1	16.6	8.2	18.0	3.9	3.4	3.4	7.5	2.2	2.7	1.9
3	3.9	1.1	5.9	3.7	9.8	7.3	19.0	5.1	25.4	2.7	26.4	7.7	11.8	8.5	13.0	9.1	17.9	3.6	6.7	3.9	5.8	2.4	2.8	2.1
4	2.6	1.3	5.7	2.8	12.3	3.1	14.5	7.1	19.0	8.2	28.2	5.6	26.7	6.7	14.2	11.0	18.8	2.8	3.7	3.5	6.8	1.5	2.9	1.2
5	2.1	2.0	6.3	3.4	4.5	4.3	21.0	2.5	23.4	5.9	16.3	11.5	16.3	9.2	19.7	7.1	18.6	2.3	6.2	4.2	3.3	3.3	4.3	1.6
6	2.7	2.6	5.1	3.8	13.6	2.5	15.7	9.6	6.8	6.0	12.3	10.8	23.4	10.6	8.8	6.2	7.5	5.4	3.9	3.6	5.7	2.0	2.3	1.9
7	3.0	2.4	5.5	4.2	14.0	5.6	19.8	4.2	19.6	10.6	16.1	11.0	8.8	7.8	9.8	7.6	16.1	4.5	5.5	5.0	6.0	1.5	4.7	1.2
8	2.4	2.4	7.9	2.9	12.3	5.1	21.2	2.9	13.5	11.3	16.0	11.5	5.9	5.3	22.3	6.8	17.3	3.3	4.9	4.1	5.4	1.5	4.4	1.2
9	4.4	1.2	2.8	2.7	14.1	3.4	20.0	5.0	17.3	9.1	16.8	12.9	13.5	9.8	22.2	6.4	16.3	4.6	7.7	6.5	6.2	1.4	2.2	1.7
10	2.2	2.1	3.8	3.7	12.7	7.3	14.1	9.4	24.1	4.8	18.3	7.8	26.8	6.7	20.6	7.0	7.5	6.1	7.4	6.3	4.9	1.5	4.3	1.2
11	1.9	1.8	5.5	5.0	16.1	3.2	17.3	5.3	23.4	5.7	17.6	11.1	7.4	6.4	22.8	4.1	16.6	3.1	7.4	5.5	4.7	2.4	3.5	1.8
12	3.0	2.8	9.4	2.3	15.1	3.1	6.0	5.1	22.2	7.4	29.1	4.1	26.6	6.4	16.0	9.6	17.3	2.0	6.5	4.6	5.2	1.9	4.5	1.2
13	3.1	2.9	10.0	2.4	10.2	8.6	18.5	6.3	19.0	7.1	28.5	5.5	13.9	10.9	13.3	8.7	16.9	2.0	8.0	5.3	5.6	1.3	4.1	1.2
14	6.1	1.3	10.5	2.5	10.7	7.2	20.5	4.7	4.3	4.1	20.2	8.8	5.3	4.7	17.3	7.2	5.2	3.4	3.5	3.5	5.4	1.3	3.8	1.6
15	2.5	2.5	9.0	3.0	13.3	6.8	8.0	7.4	26.2	7.0	18.5	7.6	27.5	5.8	3.6	3.5	16.3	2.2	2.9	2.9	4.5	2.0	1.9	1.9
16	3.6	2.2	4.3	3.7	11.3	6.0	5.1	4.6	22.3	10.3	28.1	4.9	28.3	3.8	3.5	3.2	16.1	2.2	4.2	3.2	4.3	1.7	2.6	1.3
17	4.6	1.5	7.5	4.3	17.7	3.5	13.8	7.6	23.3	8.7	26.3	5.8	24.1	5.3	21.8	4.1	15.3	3.1	8.2	2.1	2.7	2.3	2.9	2.4
18	4.7	3.0	7.1	4.8	16.9	3.2	16.7	8.4	17.5	13.0	24.7	8.3	26.3	5.3	9.9	6.9	13.3	5.2	2.7	2.6	3.8	2.0	1.5	1.5
19	5.2	1.1	7.5	5.5	12.7	7.9	22.2	2.8	6.3	5.5	22.1	6.6	26.5	5.8	8.6	7.3	15.6	2.0	9.7	2.7	4.6	2.1	1.0	1.0
20	5.3	1.1	9.7	4.1	6.5	6.1	12.9	9.3	10.4	8.8	24.2	8.4	18.7	10.2	20.1	5.1	1.7	1.6	5.6	3.8	3.5	2.8	4.7	1.1
21	5.2	1.2	9.7	3.7	7.9	7.6	11.7	7.4	22.4	12.9	4.5	3.7	25.7	5.7	21.1	4.2	15.8	2.2	3.4	2.9	2.2	2.0	4.3	1.1
22	2.9	2.9	7.8	6.3	3.4	3.2	20.7	7.2	22.7	6.5	9.4	8.0	17.8	7.9	21.0	4.0	14.1	3.5	3.6	3.2	4.4	1.1	2.0	1.7
23	7.2	1.4	5.2	4.2	12.5	10.6	19.0	8.7	28.6	3.4	28.0	6.3	24.1	7.5	17.3	6.8	14.5	1.9	7.2	2.9	4.2	1.9	2.9	2.0
24	7.5	1.5	4.8	4.7	17.6	4.8	14.6	7.4	8.6	7.6	28.6	5.9	25.7	4.4	20.3	3.7	14.2	2.0	4.1	3.5	3.3	1.2	5.1	1.2
25	7.9	1.5	7.5	6.8	12.4	9.6	21.8	7.9	21.4	9.0	23.2	8.2	25.2	5.4	20.9	2.4	14.4	2.0	4.9	3.2	4.8	1.0	3.7	1.5
26	7.7	1.5	13.9	3.1	18.1	2.9	21.3	6.5	22.4	9.6	24.6	6.2	11.6	7.3	17.6	5.2	8.8	3.8	6.3	3.5	2.7	1.3	4.9	2.0
27	4.2	3.7	12.4	4.0	14.7	10.0	20.4	8.9	28.5	3.1	19.9	8.8	24.1	7.7	6.9	5.9	5.1	4.2	2.0	1.9	4.0	1.9	4.0	1.2
28	4.0	3.8	13.0	2.8	19.4	2.9	21.8	6.4	27.0	5.2	28.6	4.0	20.6	8.0	19.2	4.2	10.6	5.1	1.7	1.6	4.1	1.1	2.0	2.0
29	4.0	3.6			19.8	3.2	16.8	10.6	28.8	3.6	10.7	8.0	15.5	10.7	19.8	3.5	9.7	5.9	3.6	2.9	2.5	2.0	1.7	1.7
30	4.4	4.2			19.6	3.2	22.5	7.9	26.3	5.0	22.4	8.9	15.3	8.1	19.2	4.5	3.9	3.5	3.5	2.6	1.5	1.5	2.5	2.1
31	6.6	1.4			19.0	3.9			28.6	4.6			17.5	9.4	18.8	4.5			2.5	2.4			4.5	1.2
TOTAL	130.4	64.6	208.9	107.1	408.2	165.5	517.1	193.8	636.0	219.1	638.4	230.1	612.5	222.7	507.9	185.4	401.6	101.3	152.6	109.0	136.8	53.7	100.6	48.2
1971-2000 Normal	129.9	71.4	210.1	105.3	362.4	173.9	492.2	178.5	596.3	222.2	638.7	228.1	633.5	216.5	529.0	185.6	351.8	127.6	239.1	92.6	123.7	73.6	95.2	54.3

COMMENTS: G= Global Radiation D= Diffuse Radiation Units = MJ/m^2

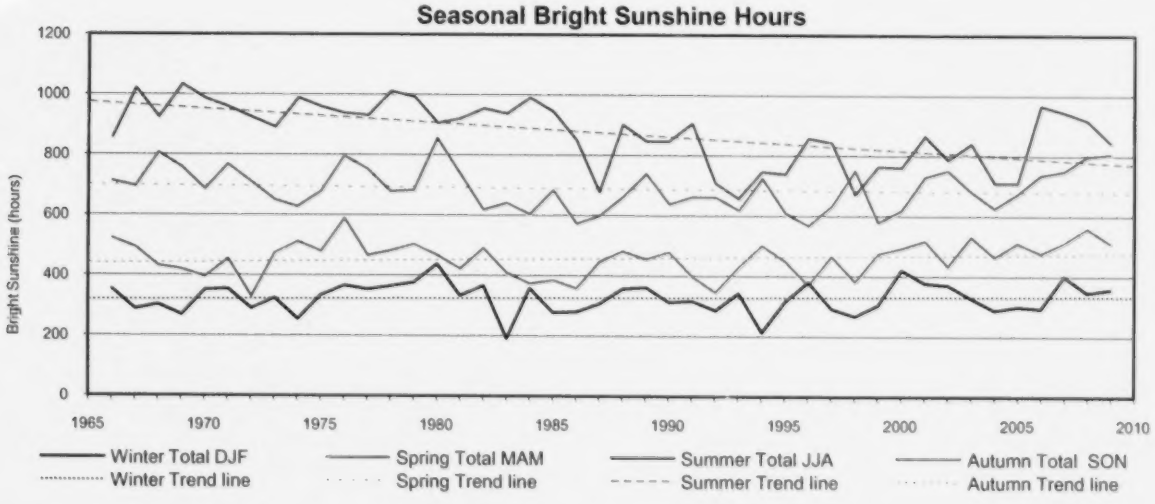
RADIATION

Annual Bright Sunshine Hours

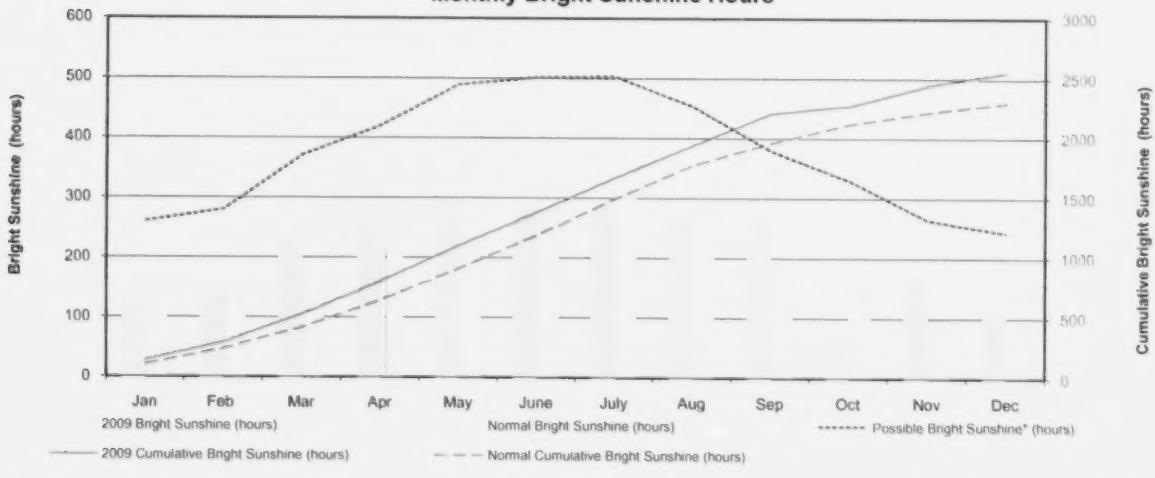


Goble, 2002, U S Geological Survey, n d

Seasonal Bright Sunshine Hours

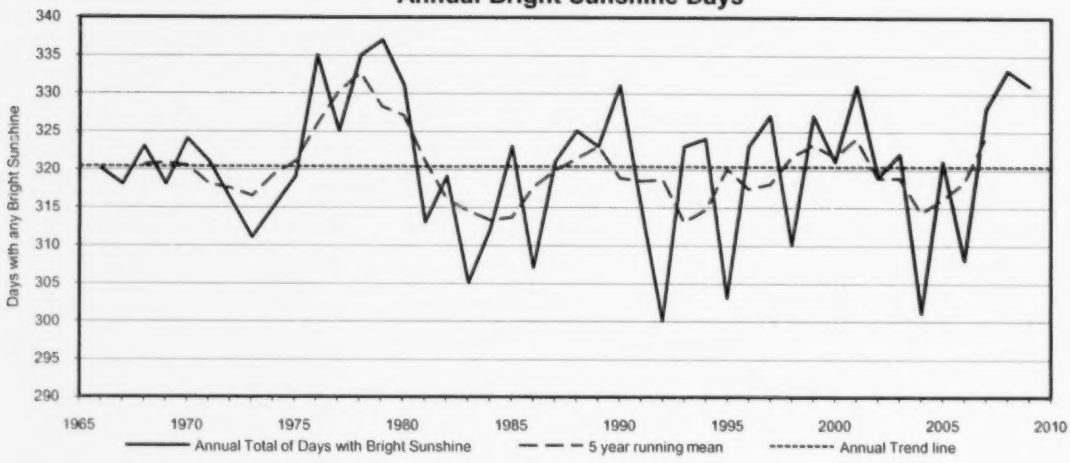


Monthly Bright Sunshine Hours

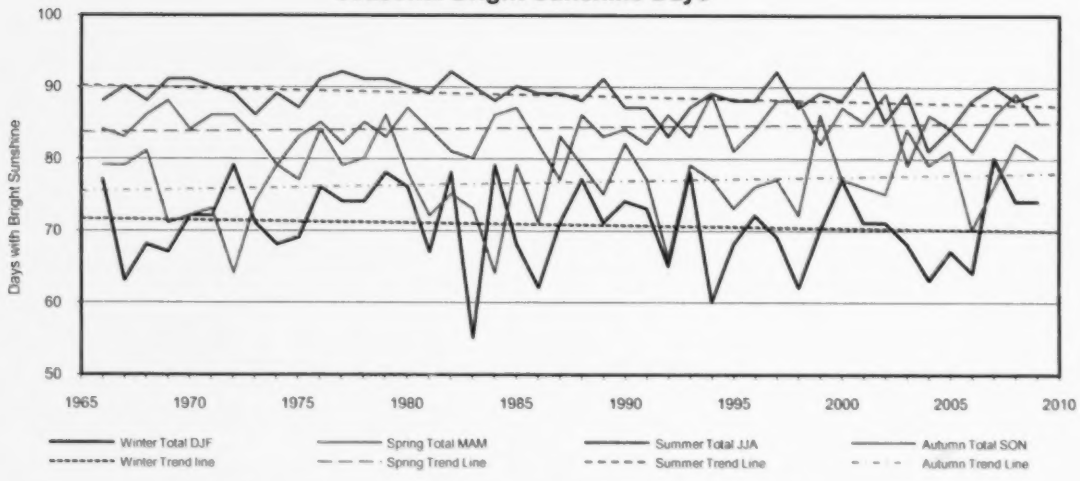


RADIATION

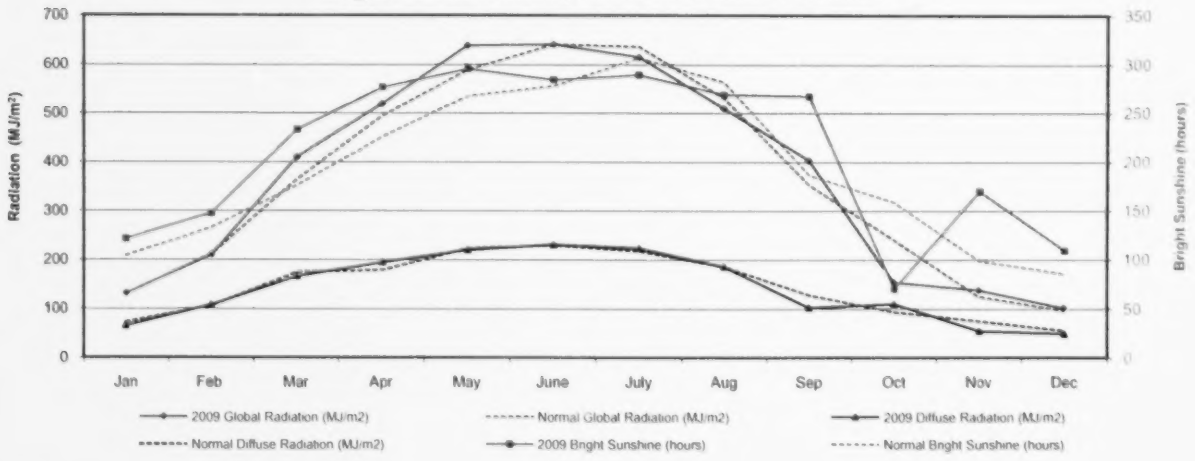
Annual Bright Sunshine Days



Seasonal Bright Sunshine Days



Bright Sunshine Hours, Global and Diffuse Radiation



RADIATION

Bright Sunshine Rankings

% OF ACTUAL TO POSSIBLE BRIGHT SUNSHINE

% Annual		% Winter (DJF)		% Spring (MAM)		% Summer (JJA)		% Autumn (SON)	
1976	58.8	1980	55.0	1980	66.7	1969	70.7	1976	60.3
1980	58.3	2000	52.8	1968	63.0	1967	69.8	2008	57.3
2008	58.1	2007	50.9	2009	62.8	1978	69.2	1966	53.3
1978	57.2	1979	47.9	2008	62.2	1979	67.9	2001	52.9
2007	57.0	2001	47.8	1976	62.1	1984	67.9	1974	52.2
1979	56.8	1996	47.7	1971	60.1	1974	67.7	2007	52.1
1971	56.3	2002	47.1	1969	59.2	1970	67.5	2009	52.1
2009	56.3	1982	46.6	1977	58.8	2006	66.1	2005	52.1
1967	56.0	1978	46.4	2002	58.6	1975	65.6	1979	51.3
2006	55.7	1976	46.0	1998	58.6	1971	65.6	1994	51.1
2001	55.7	2009	45.8	2007	58.6	1982	65.4	2000	50.3
1977	55.4	1989	45.8	1989	57.6	1985	64.8	1967	50.2
1969	55.3	1971	45.2	1981	57.6	2007	64.7	1982	50.0
1975	55.0	1966	45.1	2006	57.4	1976	64.2	1988	49.3
1968	54.2	1977	45.0	2001	56.9	1983	64.2	1978	49.1
1970	53.9	1984	44.9	1994	56.6	1977	63.8	2003	49.1
1981	53.8	1988	44.8	1966	55.7	1968	63.3	1975	48.9
1974	53.8	1970	44.6	1972	55.4	1972	63.3	1990	48.7
1966	53.5	2008	43.5	1967	54.4	1981	63.1	2006	48.5
1989	53.1	1993	43.4	1970	53.6	2008	62.9	1973	48.3
1988	53.0	1975	42.4	1979	53.4	1980	62.0	1980	47.7
1982	52.8	1981	42.2	1985	53.4	1991	61.9	1977	47.6
2003	52.1	2003	41.6	2003	53.3	1988	61.8	1997	47.5
2002	51.6	1973	41.2	1975	53.1	1973	61.1	2004	47.4
1984	51.6	1991	40.2	1978	53.0	2001	59.2	1989	46.5
1990	51.0	1995	40.2	2005	52.4	1996	58.7	1971	46.2
1973	51.0	1990	39.7	1991	51.7	1966	58.7	1995	45.8
1985	50.5	1987	38.9	1988	51.6	1986	58.2	1987	45.5
1991	50.5	1999	38.5	1992	51.5	1989	58.1	1999	44.2
2000	50.0	1968	38.0	1973	50.8	1990	58.0	2002	44.1
1972	49.8	2005	37.9	1983	50.1	2009	57.8	1968	44.0
1997	49.6	2006	37.1	1990	49.8	1997	57.7	1993	43.8
1994	49.6	1997	37.0	1997	49.3	2003	57.4	1981	43.1
2005	49.1	1967	36.5	1974	49.0	2002	53.8	1969	42.9
1983	48.9	1972	36.3	2004	48.7	1999	52.2	1983	41.5
1996	47.9	2004	35.9	1982	48.3	2000	52.1	1991	40.4
1999	46.5	1992	35.9	1993	48.2	1994	51.0	1970	40.2
1995	46.5	1986	35.6	2000	48.1	1995	50.5	1985	39.3
1986	46.0	1985	35.1	1995	47.6	2004	48.5	1998	38.9
1998	46.0	1969	34.0	1984	47.0	2005	48.5	1984	38.1
1987	45.1	1998	33.7	1987	46.8	1992	48.4	1996	37.7
1993	44.9	1974	32.2	1999	45.2	1987	46.3	1986	36.4
2004	44.8	1994	26.9	1986	44.7	1998	45.8	1992	35.3
1992	43.8	1983	24.2	1996	44.1	1993	44.9	1972	33.6

DAYS WITH BRIGHT SUNSHINE

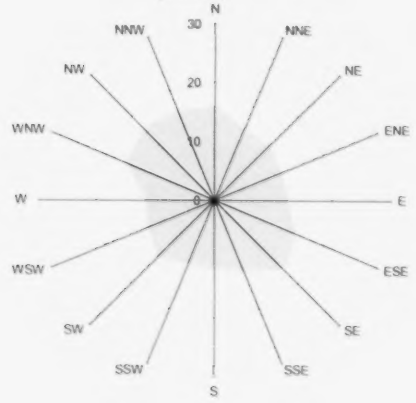
Annual		Winter (DJF)		Spring (MAM)		Summer (JJA)		Autumn (SON)	
1979	337	2007	80	1994	89	1977	92	1979	86
1976	335	1972	79	2002	89	1982	92	1999	86
1978	335	1984	79	2008	89	1997	92	1976	84
2008	333	1979	78	1969	88	2001	92	2003	84
1980	331	1982	78	1997	88	1969	91	1987	83
1990	331	1993	78	1998	88	1970	91	1990	82
2001	331	1966	77	1980	87	1976	91	2008	82
2009	331	1988	77	1985	87	1978	91	1968	81
2007	328	2000	77	2000	87	1979	91	2005	81
1997	327	1976	76	1968	86	1989	91	1978	80
1999	327	1980	76	1971	86	1967	90	2009	80
1977	325	1977	74	1972	86	1971	90	1966	79
1988	325	1978	74	1984	86	1980	90	1967	79
1970	324	1990	74	1988	86	1983	90	1974	79
1994	324	2008	74	1992	86	1985	90	1977	79
1968	323	2009	74	2004	86	2007	90	1985	79
1985	323	1991	73	2007	86	1972	89	1988	79
1989	323	1970	72	1976	85	1974	89	1993	79
1993	323	1971	72	1978	85	1981	89	2004	79
1996	323	1996	72	2001	85	1986	89	1980	78
2003	322	1973	71	2009	85	1987	89	1975	77
1971	321	1987	71	1966	84	1994	89	1991	77
1987	321	1989	71	1970	84	1999	89	1994	77
2000	321	2001	71	1981	84	2003	89	1997	77
2005	321	2002	71	1990	84	2009	89	2000	77
1966	120	1999	70	1996	84	1966	88	1996	76
1975	319	1975	69	2005	84	1968	88	2001	76
1982	319	1997	69	1967	83	1984	88	2007	76
2002	319	1968	68	1973	83	1988	88	1982	75
1967	318	1974	68	1975	83	1995	88	1989	75
1969	318	1985	68	1979	83	1996	88	2002	75
1972	316	1995	68	1989	83	2000	88	1973	74
1974	315	2003	68	1993	83	2006	88	1971	73
1991	315	1969	67	1977		2008	88	1983	73
1981	313	1981	67	1986	82	1975	87	1995	73
1984	312	2005	67	1991	82	1990	87	1970	72
1973	311	1992	65	1999	82	1991	87	1981	72
1998	310	2006	64	1982	81	1993	87	1998	72
2006	308	1967	63	1995	81	1998	87	1969	71
1986	307	2004	63	2006	81	1973	86	1986	71
1983	305	1986	62	1983	80	2002	85	2006	70
1995	303	1998	62	1974	79	2005	84	1992	66
2004	301	1994	60	2003	79	1992	83	1972	64
1992	300	1983	55	1987	77	2004	81	1984	64

WIND

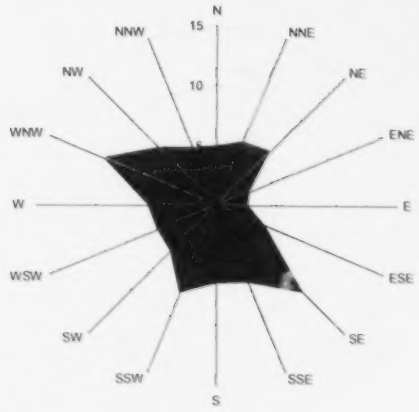
MONTH	AVERAGE WIND SPEED (km/h)			HIGHEST INSTANTANEOUS WIND SPEED (km/h)							
	2009 Average	Normal*	2009 Peak Speed Average	2009 for CRS (Speed / direction / date)			Since 1953 (Saskatoon Diefenbaker Int'l. Airport) (Speed / direction / day / year)			
January	14.3	16	40.8	66.1	WNW	31	111	W	11	1986
February	12.5	16	39.2	58.4	NW	01	106	N	22	1988
March	16.1	17	40.7	54.7	NNW	05	93	W	18	1959
April	14.3	18	45.4	59.7	NW	18	108	W	06	1959
May	16.7	18	48.6	65.0	WNW	27	132	SW	17	1965
June	14.9	17	44.7	65.1	N	28	117	S	01	1986
July	13.7	16	43.0	58.9	WNW	20	113	E	05	1955
August	13.3	16	41.1	56.7	WNW	11	151	W	14	1967
September	15.3	17	45.2	75.0	SSE	29	148	W	22	1967
October	13.6	17	41.7	59.9	NNW	07	138	NW	16	1967
November	14.0	16	42.4	70.4	WSW	06	100	W	17	1967
December	11.6	16	37.0	42.3	N	06	121	W	12	1955

*1961-90 Normals used are from the Environment Canada, Saskatoon Diefenbaker International Airport station, 1993

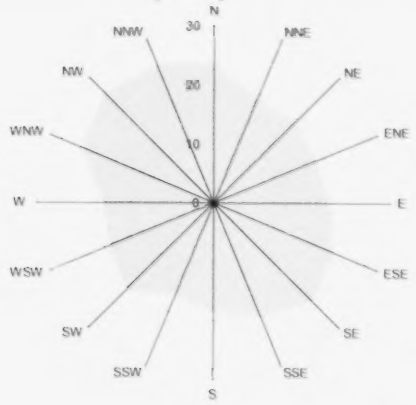
Wind Speed Average by Direction (km/h)



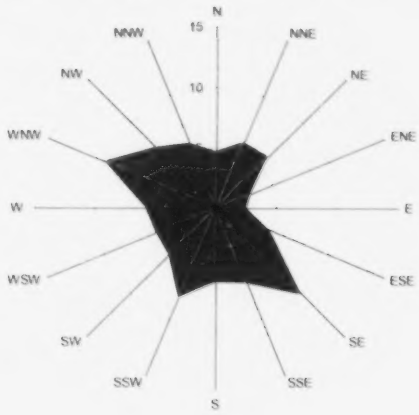
Wind Frequency by Direction (%)



Peak Wind Speed Average by Direction (km/h)



Peak Wind Frequency by Direction (%)



WIND

EXTREME DAILY WINDS (km/h)

DATE	WIND SPEED/ DIRECTION	BEAUFORT WIND SCALE DESIGNATION*
January 11	55.4 NNE	Near Gale
January 16	57.9 NW	Near Gale
January 22	54.6 N	Near Gale
January 31	66.1 WNW	Gale
February 1	58.4 NW	Gale
March 3	54.0 SW	Near Gale
March 5	54.7 NNW	Near Gale
March 21	52.5 SE	Near Gale
April 10	52.4 SSE	Near Gale
April 18	59.7 NW	Near Gale
April 22	51.2 SE	Near Gale
April 23	55.5 WNW	Near Gale
May 5	60.5 SW	Near Gale
May 12	54.1 N	Near Gale
May 13	61.3 N	Near Gale
May 17	63.0 N	Gale
May 18	54.0 N	Near Gale
May 19	58.5 ESE	Near Gale
May 26	60.8 S	Near Gale
May 27	65.0 S	Gale
May29	51.1 NW	Near Gale
May30	52.3 N	Near Gale
May 31	51.0 NW	Near Gale
June 4	52.1 NNE	Near Gale
June 11	52.9 NNE	Near Gale
June 14	56.4 SW	Near Gale
June 21	57.6 ESE	Near Gale
June 23	61.1 W	Near Gale
June 25	64.7 SW	Gale
June 28	65.1 N	Gale
June 30	51.6 SSE	Near Gale
July 7	53.0 ESE	Near Gale
July 9	57.1 NNW	Near Gale
July 14	57.9 NNW	Near Gale
July 20	58.9 WNW	Near Gale
August 11	56.7 WNW	Near Gale
September 3	51.5 NE	Near Gale
September 6	60.3 SW	Near Gale
September 14	54.5 ENE	Near Gale
September 27	64.6 NW	Gale
September 28	51.7 SE	Near Gale
September 29	75.0 SSE	Gale
October 7	59.9 NNW	Near Gale
October 9	51.0 NW	Near Gale
November 1	63.2 WNW	Gale
November 6	70.4 WSW	Gale

*Near Gale >=51 but < 63 *Gale >=63 but <76
*Strong Gale >=76 but <88 *Storm >=88 but <102

WINDCHILL CALCULATION CHART [1]

T°C Speed km/h	5°	0°	-5°	-10°	-15°	-20°	-25°	-30°	-35°	-40°	-45°	-50°
5	-4	-2	-7	-13	-19	-24	-30	-36	-41	-47	-53	**-58**
10	-3	-3	-9	-15	-21	-27	-33	-39	-45	-51	**-57**	**-63**
15	-2	-4	-11	-17	-23	-29	-35	-41	-48	-54	**-60**	**-66**
20	-1	-5	-12	-18	-24	-31	-37	-43	-49	**-56**	**-62**	**-68**
25	-1	-6	-12	-19	-25	-32	-38	-45	-51	**-57**	**-64**	**-70**
30	0	-7	-13	-20	-26	-33	-39	-46	-52	**-59**	**-65**	**-72**
35	0	-7	-14	-20	-27	-33	-40	-47	-53	**-60**	**-66**	**-73**
40	-1	-7	-14	-21	-27	-34	-41	-48	-54	**-61**	**-68**	**-74**
45	-1	-8	-15	-21	-28	-35	-42	-48	**-55**	**-62**	**-69**	**-75**
50	-1	-8	-15	-22	-29	-35	-42	-49	**-56**	**-63**	**-70**	**-76**
55	-2	-9	-15	-22	-29	-36	-43	-50	**-57**	**-63**	**-70**	**-77**
60	-2	-9	-16	-23	-30	-37	-43	-50	**-57**	**-64**	**-71**	**-78**
65	-2	-9	-16	-23	-30	-37	-44	-51	**-58**	**-65**	**-72**	**-79**
70	-2	-9	-16	-23	-30	-37	-44	-51	**-59**	**-66**	**-73**	**-80**
75	-3	-10	-17	-24	**-31**	-38	-45	-52	**-59**	**-66**	**-73**	**-80**
80	-3	-10	-17	-24	**-31**	-38	-45	-52	**-60**	**-67**	**-74**	**-81**

Approximate Thresholds

-28	Increasing risk of frostbite for most people within 30 minutes of exposure
-36	High risk for most people in 5 to 10 minutes of exposure
-48	High risk for most people in 2 to 5 minutes of exposure
-55	High risk for most people in 2 minutes of exposure or less

1 Environment Canada, 2004b

DAILY WIND CHILL VALUE < 5°C AND WIND SPEED >5 km/h

DATE	JAN	FEB	MAR	APR	MAY	JUN	JLY	AUG	SEP	OCT	NOV	DEC
1	-34.6	-34.7	-35.5	-12.7							-10.7	-13.6
2	-36.1	-37.1	-24.3	-11.5						-0.5	-13.1	-19.7
3	-46.4	-26.8	-19.8	-12.4							-8.4	-23.3
4	-46.4	-16.1	-13.9	-11.3						-0.2	-8.3	-25.9
5	-40.2	-13.7	-28.1	-8.1						-0.2	-8.8	-22.8
6	-29.3	-20.3	-33.1	-10.1	-3.1					-2.8	-0.2	-28.1
7	-30.1	-19.0	-35.3	-4.9						-6.0	-6.2	-36.7
8	-30.9	-12.6	-31.8	-6.5	-0.7					-15.5	-6.4	-41.2
9	-34.1	-15.5	-40.2	-7.6						-16.3	-10.8	-38.2
10	-27.9	-13.5	-40.2	-6.0						-12.7	-3.4	-36.6
11	-29.5	-23.8	-45.3	-4.6						-11.3	-9.2	-38.9
12	-32.4	-29.8	-34.5	-1.3						-12.2	-10.5	-45.7
13	-38.9	-32.4	-19.6	-3.6						-12.4	-12.0	-45.6
14	-40.9	-31.4	-23.8	-3.7						-7.8	-13.7	-43.6
15	-38.8	-34.4	-25.0	-4.1						-5.1	-13.3	-43.0
16	-20.0	-30.1	-20.2	-4.0						-5.1	-4.1	-29.3
17	-10.8	-25.6	-24.5	-4.1						-3.2		-24.7
18	-6.8	-31.4	-27.0	-5.6						-1.0	-4.0	-22.0
19	-16.4	-26.1	-27.1	-3.9						-7.3	-11.3	-15.8
20	-15.8	-27.6	-17.1	-1.7						-6.0	-6.7	-24.1
21	-20	-23.1	-13.2	-0.2						-0.1	-6.0	-28.8
22	-32.4	-23.2	-7.3	-1.5						-3.1	-12.1	-24.7
23	-38.7	-24.3	-17.8	-7.4						na	-13.9	-32.6
24	-41.1	-28.1	-24.5	-6.5						na	-12.4	-36.0
25	-39.3	-33.1	-24.1	-10.4						na	-10.2	-34.4
26	-41.2	-39.1	-17.6	-4.9						na	-11.2	-34.4
27	-34.2	-40.4	-20.3	-10.2						-4.6	-7.2	-24.7
28	-18.1	-32.5	-12.9	-11.5					-0.1	-4.4	-13.4	-21.2
29	-23.7		-12.6	-10.0					-0.3	-6.3	-16.8	-24.9
30	-8.6		-14.3	-6.6						-7.9	-5.4	-25.6
31	-13.7		-12.7							-8.0		-38.1

WIND

EXTREME DAILY WINDS (km/h)

DATE	WIND SPEED/ DIRECTION	BEAUFORT WIND SCALE DESIGNATION*
January 11	55.4 NNE	Near Gale
January 16	57.9 NW	Near Gale
January 22	54.6 N	Near Gale
January 31	66.1 WNW	Gale
February 1	58.4 NW	Gale
March 3	54.0 SW	Near Gale
March 5	54.7 NNW	Near Gale
March 21	52.5 SE	Near Gale
April 10	52.4 SSE	Near Gale
April 18	59.7 NW	Near Gale
April 22	51.2 SE	Near Gale
April 23	55.5 WNW	Near Gale
May 5	60.5 SW	Near Gale
May 12	54.1 N	Near Gale
May 13	61.3 N	Near Gale
May 17	63.0 N	Gale
May 18	54.0 N	Near Gale
May 19	58.5 ESE	Near Gale
May 26	60.8 S	Near Gale
May 27	65.0 S	Gale
May29	51.1 NW	Near Gale
May30	62.3 N	Near Gale
May 31	51.0 NW	Near Gale
June 4	52.1 NNE	Near Gale
June 11	52.9 NNE	Near Gale
June 14	56.4 SW	Near Gale
June 21	57.6 ESE	Near Gale
June 23	61.1 W	Near Gale
June 25	64.7 SW	Gale
June 28	65.1 N	Gale
June 30	51.6 SSE	Near Gale
July 7	53.0 ESE	Near Gale
July 9	57.1 NNW	Near Gale
July 14	57.9 NNW	Near Gale
July 20	58.9 WNW	Near Gale
August 11	56.7 WNW	Near Gale
September 3	51.5 NE	Near Gale
September 6	60.3 SW	Near Gale
September 14	54.5 ENE	Near Gale
September 27	64.6 NW	Gale
September 28	51.7 SE	Near Gale
September 29	75.0 SSE	Gale
October 7	59.9 NNW	Near Gale
October 9	51.0 NW	Near Gale
November 1	63.2 WNW	Gale
November 6	70.4 WSW	Gale

*Near Gale >=51 but < 63 *Gale >=63 but <76
*Strong Gale >=76 but <88 *Storm >=88 but <102

WINDCHILL CALCULATION CHART [1]

T°C Speed km/h	5°	0°	-5°	-10°	-15°	-20°	-25°	-30°	-35°	-40°	-45°	-50°
5	4	-2	-7	-13	-19	-24	-30	-36	-41	-47	-53	-58
10	3	-3	-9	-15	-21	-27	-33	-39	-45	-51	-57	-63
15	2	-4	-11	-17	-23	-29	-35	-41	-48	-54	-60	-66
20	1	-5	-12	-18	-24	-31	-37	-43	-49	-56	-62	-68
25	1	-6	-12	-19	-25	-32	-38	-45	-51	-57	-64	-70
30	0	-7	-13	-20	-26	-33	-39	-46	-52	-59	-65	-72
35	0	-7	-14	-20	-27	-33	-40	-47	-53	-60	-66	-73
40	-1	-7	-14	-21	-27	-34	-41	-48	-54	-61	-68	-74
45	-1	-8	-15	-21	-28	-35	-42	-48	-55	-62	-69	-75
50	-1	-8	-15	-22	-29	-35	-42	-49	-56	-63	-70	-76
55	-2	-9	-15	-22	-29	-36	-43	-50	-57	-63	-70	-77
60	-2	-9	-16	-23	-30	-37	-43	-50	-57	-64	-71	-78
65	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79
70	-2	-9	-16	-23	-30	-37	-44	-51	-59	-66	-73	-80
75	-3	-10	-17	-24	-31	-38	-45	-52	-59	-66	-73	-80
80	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81

Approximate Thresholds

-28	Increasing risk of frostbite for most people within 30 minutes of exposure
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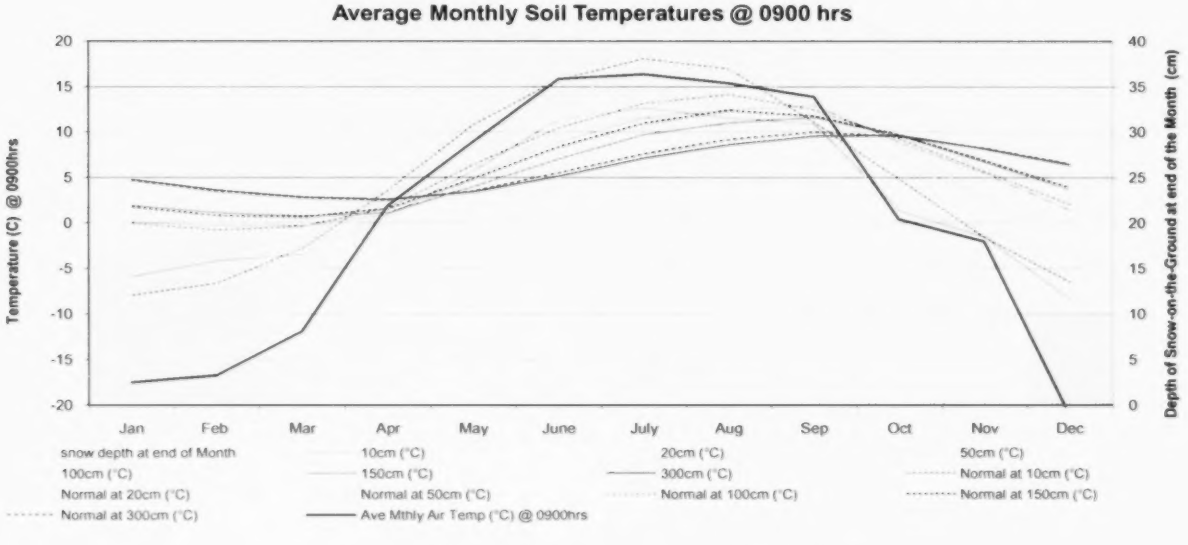
1 Environment Canada. 2004b

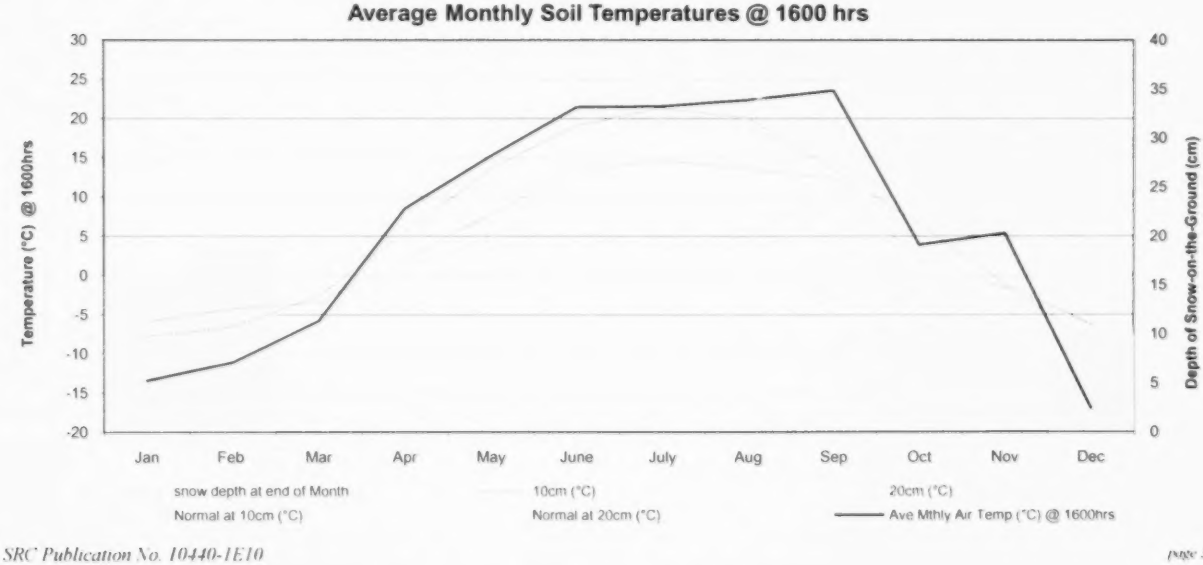
DAILY WIND CHILL VALUE < 5°C AND WIND SPEED >5 km/h

DATE	JAN	FEB	MAR	APR	MAY	JUN	JLY	AUG	SEP	OCT	NOV	DEC
1	-34.6	-34.7	-35.5	-12.7							-10.7	-13.6
2	-36.1	-37.1	-24.3	-11.5						-0.5	-13.1	-19.7
3	-46.4	-26.8	-19.8	-12.4							-8.4	-23.3
4	-46.4	-16.1	-13.9	-11.3						-0.2	-8.3	-25.9
5	-40.2	-13.7	-28.1	-8.1						-0.2	-8.8	-22.8
6	-29.3	-20.3	-33.1	-10.1	-3.1					-2.8	-0.2	-28.1
7	-30.1	-19.0	-35.3	-4.9						-6.0	-6.2	-36.7
8	-30.9	-12.6	-31.8	-6.5	-0.7					-15.5	-6.4	-41.2
9	-34.1	-15.5	-40.2	-7.6						-16.3	-10.8	-38.2
10	-27.9	-13.5	-40.2	-6.0						-12.7	-3.4	-36.6
11	-29.5	-23.8	-45.3	-4.6						-11.3	-9.2	-38.9
12	-32.4	-29.8	-34.5	-1.3						-12.2	-10.5	-45.7
13	-38.9	-32.4	-19.6	-3.6						-12.4	-12.0	-45.6
14	-40.9	-31.4	-23.8	-3.7						-7.8	-13.7	-43.6
15	-38.8	-34.4	-25.0	-4.1						-5.1	-13.3	-43.0
16	-20.0	-30.1	-20.2	-4.0						-5.1	-4.1	-29.3
17	-10.8	-25.6	-24.5	-4.1						-3.2		-24.7
18	-6.8	-31.4	-27.0	-5.6						-1.0	-4.0	-22.0
19	-16.4	-26.1	-27.1	-3.9						-7.3	-11.3	-15.8
20	-15.8	-27.6	-17.1	-1.7						-6.0	-6.7	-24.1
21	-20	-23.1	-13.2	-0.2						-0.1	-6.0	-28.8
22	-32.4	-23.2	-7.3	-1.5						-3.1	-12.1	-24.7
23	-38.7	-24.3	-17.8	-7.4						na	-13.9	-32.6
24	-41.1	-28.1	-24.5	-6.5						na	-12.4	-36.0
25	-39.3	-33.1	-24.1	-10.4						na	-10.2	-34.4
26	-41.2	-39.1	-17.6	-4.9						na	-11.2	-34.4
27	-34.2	-40.4	-20.3	-10.2						-4.6	-7.2	-24.7
28	-18.1	-32.5	-12.9	-11.5					-0.1	-4.4	-13.4	-21.2
29	-23.7		-12.6	-10.0					-0.3	-6.3	-16.8	-24.9
30	-8.6		-14.3	-6.6						-7.9	-5.4	-25.8
31	-13.7		-12.7							-8.0		-38.1

SOIL TEMPERATURES

MONTH	Mean Air Temp @ 0900h (°C)	SOIL TEMPERATURES (C°) @ 0900hrs												Mean Air Temp @ 1600h (°C)	SOIL TEMPERATURES @ 1600hrs			
		10cm		20cm		50cm		100cm		150cm		300cm			10cm		20cm	
		2009	NORM	2009	NORM	2009	NORM	2009	NORM	2009	NORM	2009	NORM		2009	NORM	2009	NORM
January	-17.5	-6.0	-8.0	-4.3	-7.1	-3.6	-3.5	0.0	-0.1	1.9	1.7	4.7	4.6	-13.5	-5.9	-7.8	-4.3	-6.2
February	-16.7	-4.2	-6.7	-2.7	-6.1	-2.8	-3.5	-0.4	-0.8	1.1	0.8	3.5	3.4	-11.2	-4.3	-6.6	-2.7	-5.2
March	-11.9	-3.5	-2.8	-2.0	-2.4	-2.6	-1.5	-0.3	-0.4	0.7	0.6	2.8	2.7	-5.9	-3.5	-2.6	-2.1	-1.8
April	1.9	0.6	3.6	0.5	4.0	0.9	3.0	0.9	1.6	1.1	1.5	2.5	2.4	8.5	2.1	5.5	0.5	4.6
May	8.9	5.7	10.8	4.8	11.3	6.3	9.3	5.0	6.4	4.0	4.8	3.3	3.4	15.2	7.8	13.6	5.0	12.0
June	15.8	11.3	15.7	10.0	16.3	11.2	14.0	8.8	10.4	7.0	8.3	5.0	5.4	21.4	13.3	19.0	10.1	17.1
July	16.4	12.6	18.0	11.5	18.9	13.7	16.7	11.5	13.1	9.7	10.9	7.0	7.5	21.5	14.6	21.3	11.6	19.5
August	15.4	11.5	16.9	10.6	18.1	13.8	16.8	12.4	14.1	11.0	12.3	8.5	9.1	22.4	13.5	20.0	10.7	18.6
September	13.9	10.8	11.0	10.0	12.5	14.0	13.2	12.9	12.4	11.6	11.7	9.5	9.9	23.5	12.3	13.4	10.0	13.1
October	0.4	1.2	4.7	1.7	6.2	6.6	8.3	8.8	9.2	9.5	9.6	9.5	9.4	3.9	1.6	6.4	1.6	6.9
November	-2.0	-1.7	-1.7	-1.5	-0.5	2.8	3.0	5.4	5.6	6.7	6.8	8.1	8.1	5.4	-1.6	-1.2	-1.5	0.3
December	-21.2	-8.5	-6.6	-6.3	-5.6	-3.3	-1.7	1.4	2.0	3.6	3.8	6.3	6.4	-17.0	-8.3	-6.3	-6.4	-4.6





SRC™ smart science solutions

Saskatchewan Research Council
Annual Weather Summary

latitude 52°09'N Longitude 106°36W asl 497 m Saskatoon

CRS estab. 1963

		2009 VALUE	2008 VALUE	NORMAL (1971-2000) OR EXTREME (1892-2004)
TEMPERATURE	Average annual maximum (°C)	7.8	8.5	8.3
	Extreme annual maximum (°C/date)	34.6 Sept 19	37.9 August 19	41.0 June 1988
	Average annual minimum (°C)	-3.8	-3.3	-3.4
	Extreme annual minimum (°C/date)	-37.4 Jan 04	-36.9 December 22	-50.0 Feb. 1893
	Annual **average** (°C)	2.0	2.6	2.5
	No.of Frost-free days (Temperature > 0°C)	160	165	197.1
	% of Frost-free days for the year	43.8%	45.1%	54.0%
DEGREE-DAYS	Annual growing (5°C base)	1646.3	1741.3	1672.9
	Annual frost-free growing (5°C base)	1409.3	1440.6	1345.3
	Annual heating (18°C base)	5948.4	5745.8	5809.0
	Annual cooling (18°C base)	122.3	134.2	119.1
PRECIPITATION	Annual total (mm)	319.3	313.8	348.2
	Greatest Daily (mm/date)	40.8/June 21	29.2 July 19	99.4 June 24, 1983
	Greatest Monthly (mm/date)	98.8 August	80.0 July	160.1/June 1991
	Measurable precipitation days (≥ 0.2mm)	119	121	115.7
	% of Precipitation days for the year	32.6%	33.2%	31.7%
WIND	Average Annual wind speed (km/h)	14.2	14.6	16.6*
	Peak gust (speed/direction/date)	75.0^{SSE}Sept 29	82.5^{W}July 27	151.0 ^{W}Aug 14, 1967*
RADIATION	Total annual bright sunshine (hours)	2524.5	2609.9	2294.1
	% possible bright sunshine	56.3	58.1	51.2
	% normal bright sunshine	110.0	113.8	
	Bright Sunshine days	331.0	333	319.9
	% of normal Bright Sunshine days	103.5	74.2	
	Total annual global radiation(MJ/m^2)	4451.0	4574.0	4391.9**
	Total annual diffuse radiation (MJ/m^2)	1700.5	1670.5	1729.6**

For Your Information

Normal and Extreme Values

The 1971-2000 normals for CRS have been calculated from original data entered on computerized spreadsheets and checked for correctness. Where suitable, missing data has been replaced with data from the University of Saskatchewan, Kernen Farm station (2.5 km E of CRS) and the Saskatoon Diefenbaker International Airport (DIA) station (10 km WNW of CRS). Wind normals marked with '*' are from the Saskatoon DIA station. Global and Diffuse radiation normals are from 1961-1990 period and are marked with'**'. Extreme values are from the Saskatoon area weather stations extending back to 1882. The earlier records from 1882 to 1901 have several large gaps.

Data for the wind roses have been compiled using Mistaya's "Windographer™"

Saskatchewan Research Council

Monthly Weather Summary

smart science solutions

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab 1963

January 2009		2009 VALUE	2008 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	-11.0	-9.3	-11.6	
	Extreme monthly maximum (°C/date)	5.3/18	5.7/15	7.0/1986/11&1993/30	11.0/1980/23$_{SWT}$
	Average monthly **minimum** (°C)	-21.4	-19.4	-21.8	
	Extreme monthly minimum (°C/date)	-37.4/04	-36.1/29	-43.9/1966/22&1969/29	-48.9/1893/31$_{SM}$
	Monthly **average** (°C)	-16.2	-14.3	-16.7	
	No. of Frost-free days (Temp. > 0°C)	0	0	0	
DEGREE-DAYS	Monthly growing (5°C base)	0.0	0.0	0.0	
	Yearly total-to-date growing	0.0	0.0	0.0	
	Monthly heating (18°C base)	1061.5	1003.1	1076.9	
	Yearly total-to-date heating	1061.5	1003.1	1076.9	
	Monthly cooling (18°C base)	0.0	0.0	0.0	
	Yearly total-to-date cooling	0.0	0.0	0.0	
PRECIPITATION	Monthly total (mm)	17.6	9.7	18.2	66.1/1911$_{SE}$
	Yearly total-to-date (mm)	17.6	9.7	18.2	
	Greatest daily (mm/date)	3.2/13	4.5/28	35.2/2007/15	36.0/2007/10$_{SA}$
	Measurable precipitation days (≥ 0.2mm)	17	8	11.3	
WIND	Average monthly speed (km/h)	14.3	14.1	15.0$_{SA}$	
	Peak gust (speed/direction/date)	66.1^{WNW}31	63.9^{WSW}15		111^{W}1986/11$_{SA}$
RADIATION	Monthly bright sunshine (hours)	120.7	105.6	103.3	
	% possible bright sunshine	46.5	40.8	39.9	
	% normal bright sunshine	103.3	102.2		
	Bright Sunshine days	27	24	23.8	
	Monthly global radiation(MJ/m^2)	130.4	123.9	129.9	
	Monthly diffuse radiation (MJ/m^2)	64.6	70.2	71.4	
SOIL	Average temperature (°C) @ 9:00am grass level	-2.8	-2.6		
	10 cm/20 cm	-6.0/-4.3	-3.3/-1.5	-8.0/-7.1	
	50 cm/100cm	-3.6/0.0	-1.0/1.5	-3.5/-0.1	
	150 cm/300cm	1.9/4.6	3.0/5.2	1.7/4.6	

Saskatoon Stations
SM=interrupted readings (NWMP) about 1892-1900
SE= Eby (pioneer) 1901-41
SA= S'toon DIA 1942-
SWT= S'toon Water Treatment Plant 1974-

Normals
Global and diffuse radiation = 1961-1990
Soil Temp = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon DIA

For Your Information

By looking at the averages for this January, an observer would not realize the temperature rollercoaster ride experienced. January temperatures began below normal in blizzard conditions and continued downward until the minimum of -37°C was reached on the 4th. However, by the 11th, the mean temperature had risen to 7°C above normal then it shot down to 11°C below normal on the 14th and rebounded to 18°C above normal on the 18th. By the 24th, once again the temperatures dove 10°C below normal only to finish the month by climbing back up to near 0°C or 14°C above normal. Joggers, dressing for their daily constitutional, had problems deciding whether to wear shorts or long johns. With over half the days recording some snow fall (necessitating continuous shovelling throughout the month) and 13 days recording less than one hour of bright sunshine, it was surprising that the bright sunshine was 17% above normal.

One sure way to ensure warm weather for the first day of the "New Year" would be to change when the 'new year' begins. A January 1st start date is new, in the long scheme of things. Up until 1752, the New Year began on March 25th in Britain. Scotland had switched in 1600 and Sweden, one of the first to change, had switched in 1529. So the earliest explorers of the Canadian prairies would have noted in their diaries of celebrating "New Years Day" with the spring flowers and not winter blizzards.[1]

[1] Wikimedia Foundation, Inc. n.d.

Saskatchewan Research Council

Monthly Weather Summary

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab. 1963

February 2009		2009 VALUE	2008 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	-9.4	-10.0	-7.7	
	Extreme monthly maximum (°C/date)	3.1/04&08	1.4/16	8.3/2005/02	12.8/1931/19$_{SE}$
	Average monthly **minimum** (°C)	-19.3	-21.2	-17.6	
	Extreme monthly minimum (°C/date)	-32.6/26	-34.7/10	-41.1/1972/06	-50.0/1893/01$_{SM}$
	Monthly **average** (°C)	-14.4	-15.6	-12.6	
	No.of Frost-free days (Temp. > 0°C)	0	0	0.2	
DEGREE-DAYS	Monthly growing (5°C base)	0.0	0.0	0.0	
	Yearly total-to-date growing	0.0	0.0	0.0	
	Monthly heating (18°C base)	906.4	974.3	886.2	
	Yearly total-to-date heating	1967.9	1976.8	1963.1	
	Monthly cooling (18°C base)	0.0	0.0	0.0	
	Yearly total-to-date cooling	0.0	0.0	0.0	
PRECIPITATION	Monthly total (mm)	6.2	3.6	13.3	43.7/1924$_{SE}$
	Yearly total-to-date (mm)	23.8	12.4	31.5	
	Greatest daily (mm/date)	1.2/24	1.4/13	14.2/1979/13	30.0/1962/03$_{SA}$
	Measurable precipitation days (≥ 0.2mm)	8	6	8.9	
WIND	Average monthly speed (km/h)	12.5	13.1	15.3$_{SA}$	
	Peak gust (speed/direction/date)	58.4^{NW}01	68.6^{NW}06		106^{N}1988/22$_{SA}$
RADIATION	Monthly bright sunshine (hours)	146.9	153.2	132.3	
	% possible bright sunshine	52.6	53.0	47.0	
	% normal bright sunshine	111.0	115.8		
	Bright Sunshine days	24	27	24.2	
	Monthly global radiation(MJ/m^2)	208.9	227.0	210.1	
	Monthly diffuse radiation (MJ/m^2)	107.1	113.6	105.3	
SOIL	Average temperature (°C) @ 9:00am grass level	-1.1	-2.3		
	10 cm/20 cm	-4.2/-2.7	-4.7/-2.7	-6.7/-6.1	
	50 cm/100cm	-2.8/-0.4	-2.2/0.6	-3.5/-0.8	
	150 cm/300cm	1.1/3.5	1.8/4.2	0.8/3.4	

Normals
Global and diffuse radiation = 1961-1990
Soil Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

Saskatoon Stations
SM=interrupted readings (NWMP) about 1892-1900
SE= Eby (pioneer) 1901-41
SA= S'toon Airport 1942-Present

For Your Information

Yes, February 2009 was cold with 18 out of 28 days below the average daily mean temperatures. Minimum temperatures of -25°C or colder occurred on eight days but, on the flip side, there were three days of maximum temperatures 0°C or greater. Bright sunshine was evident for 14.6 hours or 11% more than normal. Luckily, at solar noon on the 2nd, the bright sunshine disappeared and shadows would not have been seen by any forecasting furry rodents, therefore, spring will be early this year. Precipitation was 53% below normal for the month and 58% below normal for the year. During the latter part of the month when temperatures were the coldest, the strongest wind gusts were only in the low 40s. The rest of the time, daily maximum wind speeds were generally moderate.

Although real "can't-see-the-end-of-your-nose" blizzards are becoming a rarity, they were a winter hazard common to many Saskatchewan pioneers. Members of a family from Semans became disoriented and lost when a blizzard caught them while crossing a lake near their homestead. This story ends happily as someone at homestead came up with the idea of playing the phonograph at its loudest to guide wanderers home.[1]

[1] Semans and District Historical Society. 1982

Saskatchewan Research Council

Monthly Weather Summary

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab. 1963

March 2009		2009 VALUE	2008 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	-4.1	0.1	-0.7	
	Extreme monthly maximum (°C/date)	5.5/04	6.3/23	20.0/1993/23	22.8/1910/23$_{SE}$
	Average monthly **minimum** (°C)	-16.0	-10.0	-10.5	
	Extreme monthly minimum (°C/date)	-33.4/11	-27.6/06	-38.9/1972/02	-43.3/1897/14$_{SM}$
	Monthly **average** (°C)	-10.1	-5.0	-5.6	
	No. of Frost-free days (Temp. > 0°C)	0	0	1.2	
DEGREE-DAYS	Monthly growing (5°C base)	0.0	0.0	2.4	
	Yearly total-to-date growing	0.0	0.0	2.4	
	Monthly heating (18°C base)	869.6	712.5	732.4	
	Yearly total-to-date heating	2837.5	2689.3	2695.5	
	Monthly cooling (18°C base)	0.0	0.0	0.0	
	Yearly total-to-date cooling	0.0	0.0	0.0	
PRECIPITATION	Monthly total (mm)	3.8	2.5	16.2	59.0/1927$_{SE}$
	Yearly total-to-date (mm)	27.6	14.9	47.7	
	Greatest daily (mm/date)	1.3/23	0.6/17&24	32.0/1967/30	32.0/1967/30$_{SRC}$
	Measurable precipitation days (≥ 0.2mm)	7	7	9.0	
WIND	Average monthly speed (km/h)	16.1	14.3	15.8$_{SA}$	
	Peak gust (speed/direction/date)	54.7^{NNW}05	60.5^{NW}02		93^{W}1959/18
RADIATION	Monthly bright sunshine (hours)	232.3	223.9	175.2	
	% possible bright sunshine	62.8	60.4	47.4	
	% normal bright sunshine	132.6	127.8		
	Bright Sunshine days	27	29	27.1	
	Monthly global radiation(MJ/m^2)	408.2	376.5	362.4	
	Monthly diffuse radiation (MJ/m^2)	165.5	146.3	173.9	
SOIL	Average temperature (°C) @ 9:00am grass level	1.3	2.2		
	10 cm/20 cm	-3.5/-2.0	-1.6/-0.1	-2.8/-2.4	
	50 cm/100cm	-2.6/-0.3	-1.2/0.4	-1.5/-0.4	
	150 cm/300cm	0.7/2.8	1.2/3.2	0.6/2.7	

Saskatoon Stations
SM=interrupted readings (NWMP) about 1892-1900
SE= Eby (pioneer) 1901-41
SRC= SK Res. Council 1963-

Normals
Global and diffuse radiation = 1961-1990
Soil Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

For Your Information

This March saw Winter very reluctant to move aside for Spring. The beginning began promising enough with seasonal temperatures but soon deteriorated to temperatures more suitable to the Polar Regions. March 10th and 11th achieved below -30°C temperatures as the daily lows. Although the monthly average temperatures were not record breaking, few people cared. Between the 9th and 11th, seven daily records for low temperatures were broken: 3 lowest daily maximum; 1 lowest daily minimum; and 3 lowest daily average temperatures. By month's end, the temperature had barely risen to seasonal. The average monthly temperature was 4.5°C below normal. On the bright side, sunshine was 33% above normal with only 4 days devoid of any bright sunshine. Eleven days achieved over 90% the possible bright sunshine. Monthly precipitation was 3.8 mm and, if you were not so inclined, did not require shovelling. Both the geese and gophers returned during March. Charles Dickens could have been describing the days this March when he observed "It was one of those March days when the sun shines hot and the wind blows cold: when it is summer in the light, and winter in the shade."[1]

[1]Garofalo, M., 2007

Saskatchewan Research Council

Monthly Weather Summary

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab. 1963

April 2009

		2009 VALUE	2008 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	9.5	8.3	10.7	
	Extreme monthly maximum (°C/date)	20.3/13	24.8/13	31.5/2001/28	33.3/1952/28$_{SA\ US}$
	Average monthly **minimum** (°C)	-3.0	-3.6	-1.7	
	Extreme monthly minimum (°C/date)	-10.5/01	-12.2/05	-27.8/1979/01	-30.5/1979/01$_{SWT}$
	Monthly **average** (°C)	3.2	2.4	4.5	
	No.of Frost-free days (Temp. > 0°C)	7	22	10.6	
DEGREE-DAYS	Monthly growing (5°C base)	26.3	31.3	61.3	
	Yearly total-to-date growing	26.3	31.3	63.7	
	Monthly heating (18°C base)	442.7	469.1	420.7	
	Yearly total-to-date heating	3280.2	3158.4	3116.2	
	Monthly cooling (18°C base)	0.0	0.0	0.3	
	Yearly total-to-date cooling	0.0	0.0	0.3	
PRECIPITATION	Monthly total (mm)	3.4	23.0	23.6	86.1/1955$_{US}$
	Yearly total-to-date (mm)	31.0	37.9	71.3	
	Greatest daily (mm/date)	1.4/18	7.6/20	24.6/1985/19	30.2/1955/19$_{US}$
	Measurable precipitation days (≥ 0.2mm)	7	12	8.4	
WIND	Average monthly speed (km/h)	14.3	16.9	17.2$_{SA}$	
	Peak gust (speed/direction/date)	59.7^{NW}18	72.7^{WSW}21		108^{W}1959/06
RADIATION	Monthly bright sunshine (hours)	275.7	233.2	225.2	
	% possible bright sunshine	65.8	55.6	53.8	
	% normal bright sunshine	122.4	103.6		
	Bright Sunshine days	28	29	27.3	
	Monthly global radiation(MJ/m^2)	517.1	478.9	492.2	
	Monthly diffuse radiation (MJ/m^2)	193.8	203.8	178.5	
SOIL	Average temperature (°C) @ 9:00am grass level	10.7	9.2		
	10 cm/20 cm	0.6/0.5	0.3/0.4	3.6/4.0	
	50 cm/100cm	0.9/0.9	0.7/1.2	3.0/1.6	
	150 cm/300cm	1.1/2.5	1.7/2.7	1.5/2.4	

Saskatoon Stations
SA= S'toon Airport 1942-
US= Univ. of SK 1915-64
SWT= S'toon Water Treatment Plant 1974-

Normals
Global and diffuse radiation = 1961-1990
Soil Temp. = 1971-2000
calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

For Your Information

Bright, cold and dry best describe this April. Twenty-eight days recorded 276 hours of bright sunshine; 22% more than normal. Twelve days received over 80% of their possible daily sunshine. Low temperatures did not greatly encourage gardeners to clean up last year's debris or begin this year's garden plot preparation. Temperatures were 1.3°C lower than normal with only 7 frost-free days. Growing degree-days were half than normal while heating degree-days were about 5% above normal. Precipitation was 14% of normal with 7 days receiving dribs and drabs to total 3.4 mm by month's end. The yearly precipitation is less than half of normal. Snow was recorded on the 24th but did not linger on the ground. Even on the north side of the climate station bunker, the snow has disappeared leaving the station totally snow free by month's end.

Problem snow drifts were an issue for the railroad in April of 1893. Between Craik and Saskatoon, 44 drifts between 200 yds (180m) to 1 mile (1.6km) long were "bucked" by the locomotive. Blocks of snow that 3 men could not lift, were thrown 50 ft (15m) away from the tracks. The drifts were so high, that the men helping to clear the tracks could step from the drifts to the top of the train engine.[1]

[1]Philips, D.W. 2008

Saskatchewan Research Council

Monthly Weather Summary

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab 1963

May 2009		2009 VALUE	2008 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	16.9	18.9	18.6	
	Extreme monthly maximum (°C/date)	31.3/30	25.9/15	35.0/1988/30	37.2/1936/27$_{SE}$
	Average monthly **minimum** (°C)	2.3	4.0	4.7	
	Extreme monthly minimum (°C/date)	-5.4/07	-3.8/02	-10.0/1967/02	-12.8/1907/06$_{SE}$
	Monthly **average** (°C)	9.6	11.5	11.6	
	No. of Frost-free days (Temp. > 0°C)	20	24	25.6	
DEGREE-DAYS	Monthly growing (5°C base)	161.6	202.4	211.6	
	Yearly total-to-date growing	187.9	233.7	275.3	
	Monthly heating (18°C base)	261.5	203.9	204.4	
	Yearly total-to-date heating	3541.7	3362.3	3320.6	
	Monthly cooling (18°C base)	0.9	1.4	7.4	
	Yearly total-to-date cooling	0.9	1.4	7.7	
PRECIPITATION	Monthly total (mm)	11.8	4.4	44.3	178.0/1977$_{SWT}$
	Yearly total-to-date (mm)	42.8	42.3	115.6	
	Greatest daily (mm/date)	3.0/24	1.2/11&30	39.9/1985/04	59.0/1999/18$_{SA}$
	Measurable precipitation days (≥ 0.2mm)	10	6	9.8	
WIND	Average monthly speed (km/h)	16.7	15.8	16.9$_{SA}$	
	Peak gust (speed/direction/date)	65.0^{WNW}27	66.8^{WNW}16		132^{SW}1965/17$_{SA}$
RADIATION	Monthly bright sunshine (hours)	294.5	338.5	267.1	
	% possible bright sunshine	60.3	69.3	54.8	
	% normal bright sunshine	110.3	126.7		
	Bright Sunshine days	30	31	29.5	
	Monthly global radiation(MJ/m^2)	636.0	697.6	586.3	
	Monthly diffuse radiation (MJ/m^2)	219.1	231.3	222.2	
SOIL	Average temperature (°C) @ 9:00am grass level	16.9	20.0		
	10 cm/20 cm	5.7/4.8	7.2/6.6	10.8/11.3	
	50 cm/100cm	6.3/5.0	6.8/5.4	9.3/6.4	
	150 cm/300cm	4.0/3.3	4.3/3.5	4.8/3.4	

Saskatoon Stations
SE= Eby (pioneer) 1901-41
SA= S'toon Airport 1942-
SWT= S'toon Water Treatment Plant 1974-

Normals
Global and diffuse radiation = 1961-1990
Soil Temp = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

For Your Information

The daily mean temperatures for May were below normal for most of the month; usually well below. It was not until the 24th that mean temperatures became seasonal. Daily records for the lowest maximum temperature were set on the 8th, 14th and 20th. Eighteen days recorded minimum temperatures below 2°C; the most for May since the station opened in 1963. The frost-free season, hopefully, began on the 21st although many gardeners are not rushing to plant their bedding plants. Monthly average soil temperatures were below normal, especially so in the upper levels. Lightning was observed on the 12th. Precipitation as both rain and snow were significantly below normal with only 11.8mm recorded; 27% of normal. Combined with the below normal precipitation for February, March and April, the cumulative precipitation for the year is 38% of normal.This is just slightly higher that 2001; the driest year recorded at CRS. Winds between 51 and 62 km/h occurred on 11 days with winds over 63 km/h registering on two of those days. If one could find a place out of the wind, there were 27 hours of above normal bright sunshine to enjoy.

Lack of rainfall plus a heat-wave with temperatures reaching 40°C combined with a broken pump at the water treatment plant had Grande Prairie, AB residents worried about the possible lack of drinking water. The city's engineer's solution to the crisis was to "Drink beer."[1]

[1]Phillips, D.W., 2008

Saskatchewan Research Council

Monthly Weather Summary

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab. 1963

	June 2009	2009 VALUE	2008 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	22.7	22.7	22.6	
	Extreme monthly maximum (°C/date)	33.2/14	34.7/30	41.0/1988/05	41.5/1988/06$_{S2}$
	Average monthly **minimum** (°C)	9.4	9.1	9.5	
	Extreme monthly minimum (°C/date)	-0.5/05	3.2/09	-3.3/1967/06	-3.9/1917/02$_{US}$
	Monthly **average** (°C)	16.0	15.9	16.0	
	No.of Frost-free days (Temp. > 0°C)	29	30	29.9	
DEGREE-DAYS	Monthly growing (5°C base)	331.4	327.4	331.5	
	Yearly total-to-date growing	519.3	561.1	606.8	
	Monthly heating (18°C base)	96.4	77.7	82.8	
	Yearly total-to-date heating	3638.1	3440.6	3403.4	
	Monthly cooling (18°C base)	37.8	15.1	22.3	
	Yearly total-to-date cooling	38.7	16.5	30.0	
PRECIPITATION	Monthly total (mm)	52.0	78.0	59.5	186.8/1942$_{S}$
	Yearly total-to-date (mm)	94.8	121.2	175.1	
	Greatest daily (mm/date)	40.8/21	21.0/26	99.4/1983/24	99.4/1983/24$_{SRC}$
	Measurable precipitation days (≥ 0.2mm)	11	16	12.5	
WIND	Average monthly speed (km/h)	14.9	12.9	16.6$_{SA}$	
	Peak gust (speed/direction/date)	65.1^{N}28	78.0^{SW}30		117^{S}1986/01$_{SA}$
RADIATION	Monthly bright sunshine (hours)	283.4	286.1	277.2	
	% possible bright sunshine	56.7	57.2	55.4	
	% normal bright sunshine	102.2	103.2		
	Bright Sunshine days	30	28	28.5	
	Monthly global radiation(MJ/m²)	638.4	625.8	638.7	
	Monthly diffuse radiation (MJ/m²)	230.1	214.7	228.1	
SOIL	Average temperature (°C) @ 9:00am grass level	24.1	23.6		
	10 cm/20 cm	11.3/10.0	11.3/10.7	15.7/16.3	
	50 cm/100cm	11.2/8.8	10.9/9.0	14.0/10.4	
	150 cm/300cm	7.0/5.0	7.6/5.4	8.3/5.4	

Saskatoon Stations
SA= S'toon Airport 1942-
US= Univ. of SK 1915-64
SRC= SK Res. Council 1963-
S= Saskatoon 1941-42
S2=Saskatoon 2 1977-90

Normals
Global and diffuse radiation = 1961-1990
Soil Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

For Your Information

Temperature:
Warmest daily maximum temperature
June 14 = 33.2ºC; old record = 32.0ºC/1987
June 25 = 31.7ºC; old record = 29.0ºC/1990
Coldest daily minimum temperature
June 5 = -0.5ºC; old record = 1.1ºC/1967
June 10 = 1.6ºC; old record = 1.7ºC/1969
Warmest daily minimum temperature
June 20 = 15.5ºC; old record = 14.3ºC/2003
Coldest daily average temperature
June 7 = 7.2ºC; old record = 8.3ºC/1982
June 9 = 8.4ºC; old record = 10.3º/84&2000
Warmest daily average temperature
June 14 = 24.5ºC; old record = 22.7ºC/2003
June 20 = 21.9ºC; old record = 21.8ºC/1988

Latest Spring Frost:
June 14/69; June 6/67; June 5/2009; June 4/85

Precipitation:
Maximum rainfall
June 21 = 40.8 mm; old record = 13.7mm/1979
This is the 8th consecutive month of below normal precipitation
This is the 3rd driest January to June period
2001=76.2mm; 2002=80.7mm; 2009=94.8mm

Wind:
Daily maximums
Strong (40-50km/h) = 6 occurrences
Near Gale (51-62 km/h) = 6 occurrences
Gale (63-75 km/h) = 2 occurrences

Weather Word for the Weatherwise
Blunk of weather (East Norfolk provincialism)
A fit of squally, tempestuous weather[1]
As in:
Last week we had a blunk of weather when it rained and blew one minute and was sunshiny and calm the next. Typical Saskatchewan summer weather!

[1] Kacirk, J. 2008

Saskatchewan Research Council

Monthly Weather Summary

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab 1963

	July 2009	2009 VALUE	2008 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	22.8	24.7	24.8	
	Extreme monthly maximum (°C/date)	31.4/18	34.0/04	39.3/ 2001/05	40.0/1919/17&1941/19&1946/30 SEUSSA
	Average monthly **minimum** (°C)	10.8	12.3	11.5	
	Extreme monthly minimum (°C/date)	4.8/12	7.7/02	1.7/1967/02&1978/09	-0.6/1918/25 SE
	Monthly **average** (°C)	16.8	18.6	18.2	
	No. of Frost-free days (Temp. > 0°C)	31	31	31	
DEGREE-DAYS	Monthly growing (5°C base)	365.5	420.7	408.4	
	Yearly total-to-date growing	884.8	981.8	1015.2	
	Monthly heating (18°C base)	59.2	22.4	35.3	
	Yearly total-to-date heating	3697.3	3463.0	3438.7	
	Monthly cooling (18°C base)	21.7	40.1	40.7	
	Yearly total-to-date cooling	60.4	56.6	70.7	
PRECIPITATION	Monthly total (mm)	62.0	80.0	58.0	162.9/1928 SE
	Yearly total-to-date (mm)	156.8	201.2	233.1	
	Greatest daily (mm/date)	13.8/07	29.2/19	45.5/1968/29	79.2/1946/03 US
	Measurable precipitation days (≥ 0.2mm)	13	13	12.0	
WIND	Average monthly speed (km/h)	13.7	12.9	14.8 SA	
	Peak gust (speed/direction/date)	58.9 WNW 20	82.5 W 27		113 E 1955/05 SA
RADIATION	Monthly bright sunshine (hours)	288.4	317.3	305.7	
	% possible bright sunshine	57.5	63.3	60.9	
	% normal bright sunshine	94.3	103.8		
	Bright Sunshine days	30	31	30.3	
	Monthly global radiation(MJ/m²)	612.5	646.8	633.5	
	Monthly diffuse radiation (MJ/m²)	222.7	228.1	216.5	
SOIL	Average temperature (°C) @ 9:00am grass level	23.8	27.4		
	10 cm/20 cm	12.6/11.5	14.0/13.7	18.0/18.9	
	50 cm/100cm	13.7/11.5	14.3/12.0	16.7/13.1	
	150 cm/300cm	9.7/7.0	10.1/7.2	10.9/7.5	

Saskatoon Stations

SE= Eby (pioneer) 1901-41
SA= S toon Airport 1942-
US= Univ. of SK 1915-64

Normals

Global and diffuse radiation = 1961-1990
Soil Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

For Your Information

Temperature:

Coldest daily maximum temperature
July 8 = 18.0°C; old record = 18.0°C/2004
July 11 = 14.0°C; old record = 18.5°C/1993
Coldest daily minimum temperature
July 10 = 6.7°C; old record = 6.7°C/1973
July 15 = 7.0°C; old record = 7.8°C/1969
July 16 = 6.2°C; old record = 6.7°C/1979
Coldest daily average temperature
July 11 = 10.4°C; old record = 12.0°C/1993
July 15 = 12.3°C; old record = 12.6°/1999

Precipitation:

Maximum rainfall
July 13 = 7.6 mm; old record = 7.2mm/2003
July was the first month since October 2008 with above normal precipitation

Wind:

Daily maximums
Near Gale (51-62 km/h) = 4 occurrences

Bright Sunshine:

First month this year of below average bright sunshine hours

Weather Word for the Weatherwise

Sun-suckers

(Shropshire Word-Book, 1879)

The sun's rays, as they sometimes appear in showery weather, popularly believed to suck up the water from the earth into the sun, there to be converted into rain, and held to be a sign of coming showers'

' Kacirk, J. 2008

Saskatchewan Research Council

Monthly Weather Summary

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab. 1963

August 2009		2009 VALUE	2008 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	23.3	26.1	24.6	
	Extreme monthly maximum (°C/date)	30.9/10	37.9/19	39.7/1998/06	39.7/1998/06$_{SRC}$
	Average monthly **minimum** (°C)	10.6	12.3	10.4	
	Extreme monthly minimum (°C/date)	6.2/05	4.6/23	-2.8/1976/28	-2.8/1901/23&1976/28$_{SM\ SRC}$
	Monthly **average** (°C)	17.0	19.2	17.5	
	No.of Frost-free days (Temp. > 0°C)	31	31	30.8	
DEGREE-DAYS	Monthly growing (5°C base)	371.4	441.7	387.8	
	Yearly total-to-date growing	1256.2	1423.5	1403.0	
	Monthly heating (18°C base)	48.2	37.4	57.7	
	Yearly total-to-date heating	3745.5	3500.4	3496.4	
	Monthly cooling (18°C base)	16.6	76.1	42.5	
	Yearly total-to-date cooling	77.0	132.7	113.2	
PRECIPITATION	Monthly total (mm)	98.8	33.2	36.2	178.9/1954$_{NRC}$
	Yearly total-to-date (mm)	255.6	234.4	269.3	
	Greatest daily (mm/date)	39.6/15	17.2/26	48.2/2007/17	84.3/1945/03$_{SA}$
	Measurable precipitation days (≥ 0.2mm)	12	7	9.8	
WIND	Average monthly speed (km/h)	12.0	15.9	14.5$_{SA}$	
	Peak gust (speed/direction/date)	56.7^{WNW}11	56.9^{WNW}28		151^{W}1967/14$_{SA}$
RADIATION	Monthly bright sunshine (hours)	268.1	310.7	280.8	
	% possible bright sunshine	59.3	68.8	62.0	
	% normal bright sunshine	95.5	110.6		
	Bright Sunshine days	29	29	30.1	
	Monthly global radiation(MJ/m^2)	507.9	577.5	529.0	
	Monthly diffuse radiation (MJ/m^2)	185.4	140.9*	185.6	
SOIL	Average temperature (°C) @ 9:00am — grass level	22.5	24.3		
	10 cm/20 cm	11.5/10.6	14.1/13.8	16.9/18.1	
	50 cm/100cm	13.8/12.4	15.4/13.4	16.8/14.1	
	150 cm/300cm	11.0/8.5	11.9/9.0	12.3/9.1	

Saskatoon Stations
SM=interrupted readings (NWMP) about 1892-1901
SA= S'toon Airport 1942-
NRC= Nat. Res. Council 1952-66
SRC= SK Res. Council 1963-

Normals
Global and diffuse radiation = 1961-1990
Soil Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

* Six days of missing data

For Your Information

After the cool July, many were hoping for a warmer than average August. Unfortunately, it was not to be. The mean maximum temperature was 1.3°C cooler than normal. There were only two days when the temperature managed to break 30°C. This is reflected in well below half the normal value for the cooling degree-days. Curiously, growing degree-days were only 4% lower than normal and heating degree-days were 16% less than normal likely due to the night time warm temperatures. It was not a cold month but it was just not blessed with really hot days. Copious amounts of rain were observed during mid month when, from August 11th to 16th a total of 84.4 mm were measured setting two daily records on the 15th and 16th. With a total of just under 100mm for August, the yearly cumulative value was 95% of normal. Winds were most frequent from the southeast with the strongest average winds from the north. The greatest gust occurred late evening of the 11th during a thunderstorm when a single, isolated "poof" of 57 km/h occurred.

Weather Words for the Weatherwise

Windshield Factor

The number of bugs per square inch that hit your windshield indicating how hot and humid the weather is.[1]

Virga

Streaks of falling rain that evaporate before reaching the ground.[1]

[1]Phillips, D.W. 1986

Saskatchewan Research Council

Monthly Weather Summary

smart science solutions

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab 1963

September 2009		2009 VALUE	2008 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	24.7	19.9	18.1	
	Extreme monthly maximum (°C/date)	34.6/19	29.3/18	35.6/1978/04	35.6/1978/04$_{SRC}$
	Average monthly **minimum** (°C)	10.0	5.4	4.9	
	Extreme monthly minimum (°C/date)	1.2/28	-2.3/26	-7.8/1974/30	-11.1/1908/28$_{SE}$
	Monthly **average** (°C)	17.3	12.7	11.6	
	No. of Frost-free days (Temp. > 0°C)	30	28	25.6	
DEGREE-DAYS	Monthly growing (5°C base)	370.3	229.7	203.5	
	Yearly total-to-date growing	1626.5	1652.6	1606.5	
	Monthly heating (18°C base)	65.0	160.8	198.9	
	Yearly total-to-date heating	3810.5	3660.9	3695.3	
	Monthly cooling (18°C base)	45.3	0.5	5.8	
	Yearly total-to-date cooling	122.3	132.8	119.0	
PRECIPITATION	Monthly total (mm)	27.4	11.0	29.4	128.4/2006$_{SRC\ KCS}$
	Yearly total-to-date (mm)	283.0	244.5	298.7	
	Greatest daily (mm/date)	12.6/30	4.6/06	52.4/2006/15	44.2/1931/12$_{US}$
	Measurable precipitation days (≥ 0.2mm)	8	7	8.4	
WIND	Average monthly speed (km/h)	15.3	13.8	15.9$_{SA}$	
	Peak gust (speed/direction/date)	75.0^{SSE}29	56.0^{WNW}28		148^{W}1967/22$_{SA}$
RADIATION	Monthly bright sunshine (hours)	266.4	259.6	186.0	
	% possible bright sunshine	70.4	68.9	49.0	
	% normal bright sunshine	143.2	139.6		
	Bright Sunshine days	29	29	27.0	
	Monthly global radiation(MJ/m^2)	401.6	402.2	351.8	
	Monthly diffuse radiation (MJ/m^2)	101.3	134.2	127.6	
SOIL	Average temperature (°C) @ 9:00am grass level	20.5	16.6		
	10 cm/20 cm	10.8/10.0	8.5/9.1	11.0/12.5	
	50 cm/100cm	14.0/12.9	11.9/11.9	13.2/12.4	
	150 cm/300cm	11.6/9.5	11.3/9.8	11.7/9.9	

Saskatoon Stations
SE= Eby (pioneer) 1901-41
SA= S'toon Airport 1942-
US= Univ. of SK 1915-64
SRC= SK Res. Council 1963-

Normals
Global and diffuse radiation = 1961-1990
Soil Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

FYI New Records for Sept.

Temperature:

Warmest daily maximum
Sept 03 = 34.1°C; old record = 32.2°C/1982
Sept 17 = 32.8°C; old record = 32.2°C/1976
Sept 19 = 34.6°C; old record = 29.5°C/1981
Sept 23 = 33.0°C; old record = 30.5°C/1994
Sept 24 = 34.5°C; old record = 29.0°C/1990

Warmest daily minimum
Sept 03 = 17.0°C; old record = 15.0°C/1969
Sept 04 = 16.3°C; old record = 15.7°C/1997
Sept 14 = 13.6°C; old record = 12.0°C/1991
Sept 17 = 14.2°C; old record = 13.3°C/1976
Sept 18 = 12.3°C; old record = 11.5°C/1994&2000
Sept 20 = 10.6°C; old record = 8.9°C/1977
Sept 23 = 10.1°C; old record = 9.7°C/1997
Sept 26 = 11.1°C; old record = 10.7°C/2001

Warmest daily Mean
Sept 03 = 25.6°C; old record = 21.4°C/2005&78
Sept 17 = 23.5°C; old record = 22.8°C/1976
Sept 19 = 23.8°C; old record = 20.5°C/1981
Sept 20 = 15.3°C; old record = 14.8°C/1987
Sept 23 = 21.6°C; old record = 19.0°C/1994
Sept 24 = 23.3°C; old record = 20.8°C/1990

Highest daily Mean for all Septembers
25.6°C; old record = 25.6°C/1978

Warmest Monthly Averages
Maximum = 24.7°C; old record = 23.1°C/1967
Minimum = 1.2°C; old record = 1.0°C/1994
Mean = 17.3°C; old record = 15.6°C/1967

Number of Days Greater Than:
20°C: 24; old record = 23/1967
30°C: 7; old record = 5/1981
32.5°C: 5; old record = 3/1967

Monthly Degree-days
Growing: Highest; 370.3; old record = 320.8/1967
Heating: Lowest; 65.0; old record = 97.2/1967
Cooling: Highest; 45.3; old record = 26.4/1967
XCooling: Highest; 1.6; old record = 1.6/1967

Bright sunshine
Most hours of bright sunshine for September:
266.4 hours; old record = 265.3hrs/2001
No. of days >= 15 hrs of bright sunshine
18 days; old record = 18/1967

Saskatchewan Research Council

Monthly Weather Summary

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab. 1963

October 2009		2009 VALUE	2008 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	5.1*	12.7	10.8	
	Extreme monthly maximum (°C/date)	16.9/17	27.9/02	28.5/1980/06&1984/08	32.2/1943/05$_{SAUS}$
	Average monthly **minimum** (°C)	-1.8*	0.5	-1.3	
	Extreme monthly minimum (°C/date)	-8.6/09	-9.0/27	-21.5/1991/29,30	-25.6/1919/26$_{SEUS}$
	Monthly **average** (°C)	1.7*	6.6	4.8	
	No.of Frost-free days (Temp. > 0°C)	10	14	11.6	
DEGREE-DAYS	Monthly growing (5°C base)	7.4	83.4	63.7	
	Yearly total-to-date growing	1633.9	1736.6	1670.2	
	Monthly heating (18°C base)	506.5	353.5	410.2	
	Yearly total-to-date heating	4317.0	4014.7	4105.5	
	Monthly cooling (18°C base)	0.0	1.0	0.1	
	Yearly total-to-date cooling	0.0	134.2	119.1	
PRECIPITATION	Monthly total (mm)	28.7	47.0	16.4	69.8/1969$_{SRC}$
	Yearly total-to-date (mm)	311.7	292.4	315.1	
	Greatest daily (mm/date)	10.4/01	17.4/05	36.7/1984/16	41.7/1924/12&1969/03$_{SESA}$
	Measurable precipitation days (≥ 0.2mm)	14	11	6.3	
WIND	Average monthly speed (km/h)	13.6	17.1	16.2$_{SA}$	
	Peak gust (speed/direction/date)	59.9^{NNW}07	75.0^{NW}25		138^{NW}1967/16$_{SA}$
RADIATION	Monthly bright sunshine (hours)	69.9	199.4	157.9	
	% possible bright sunshine	21.3	60.8	48.0	
	% normal bright sunshine	44.3	126.3		
	Bright Sunshine days	23	28	27.0	
	Monthly global radiation(MJ/m^2)	152.6	226.8	239.1	
	Monthly diffuse radiation (MJ/m^2)	109.0	76.8	92.6	
SOIL	Average temperature (°C) @ 9:00am — grass level	6.8	9.2		
	10 cm/20 cm	1.2/1.7	3.1/3.8	4.7/6.2	
	50 cm/100cm	6.6/8.8	7.5/9.3	8.3/9.2	
	150 cm/300cm	9.5/9.5	9.7/9.5	9.6/9.4	

Saskatoon Stations
SE= Eby (pioneer) 1901-41
SA= S'toon Airport 1942-
US= Univ. of SK 1915-64
SRC= SK Res. Council 1963-

Normals
Global and diffuse radiation = 1961-1990
Soil Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

***NOTE**
Temperature data from Oct. 23-26 provided by Diefenbaker Int'l A. Saskatoon due to temperature sensor maintenance

For Your Information

Temperature Records:

Coldest daily maximum
Oct 09 = -2.1ºC; old record = 0.5ºC/1987
Oct 10 = -0.9ºC; old record = -0.6ºC/1969
Oct 11 = -2.1ºC; old record = -0.8ºC/1998
Oct 13 = 0.5ºC; old record = 2.0ºC/1998

Coldest daily minimum
Oct 13 = -7.5ºC; old record = -6.9ºC/1968

Coldest daily Mean
Oct 08 = -4.2ºC; old record = -3.9ºC/1970
Oct 09 = -5.4ºC; old record = -5.3ºC/1970
Oct 10 = -3.2ºC; old record = -2.0ºC/1969
Oct 12 = -3.7ºC; old record = -3.7ºC/2006
Oct 13 = -3.5ºC; old record = -1.5ºC/1998

Lowest Maximum Mean for all Octobers (1963)
9.0ºC; old record = 9.2ºC/2002

Least Number of Days Greater Than:
10°C: 2; old record =4/1969

Monthly Degree-days Records
Growing: Lowest: 7.4; old record = 10.3/1969

Frost-free Season
Last Spring frost = June 05
First Fall Frost = Oct 07
123 continuous frost-free days.

Precipitation Records
Greatest daily ppt
Oct 01 = 10.4mm; old record = 3.0mm/1968

Bright sunshine Records
Least hours of bright sunshine for October:
69.9 hours; old record = 104.2hrs/1981
Least No. of days with >= 5 hrs of bright sunshine
3 days; old record = 10/1981 1999

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Monthly Weather Summary

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab 1963

November 2009		2009 VALUE	2008 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	6.7	2.8	-1.4	
	Extreme monthly maximum (°C/date)	16.8/06	14.0/01	19.4/1975/04	21.7/1903/03$_{SE}$
	Average monthly **minimum** (°C)	-4.4	-5.7	-10.3	
	Extreme monthly minimum (°C/date)	-10.529	-12.6/20	-33.5/1985/24	-39.4/1893/30$_{SM}$
	Monthly **average** (°C)	1.1	-1.5	-5.9	
	No. of Frost-free days (Temp. > 0°C)	2	3	1.2	
DEGREE-DAYS	Monthly growing (5°C base)	12.4	4.7	2.6	
	Yearly total-to-date growing	1646.3	1741.3	1672.8	
	Monthly heating (18°C base)	505.8	583.6	715.8	
	Yearly total-to-date heating	4822.8	4598.3	4821.3	
	Monthly cooling (18°C base)	0.0	0.0	0.0	
	Yearly total-to-date cooling	122.3	134.2	119.1	
PRECIPITATION	Monthly total (mm)	0.4	6.4	14.8	57.3/1940$_{SE}$
	Yearly total-to-date (mm)	312.1	298.8	329.9	
	Greatest daily (mm/date)	0.4/01	2.8/03	19.3/1978/04	27.9/1938/01$_{US}$
	Measurable precipitation days (≥ 0.2mm)	1	9	7.9	
WIND	Average monthly speed (km/h)	14.0	14.7	14.8$_{SA}$	
	Peak gust (speed/direction/date)	70.4^{WSW}06	60.3^{W}22		100^{W}1976/17$_{SA}$
RADIATION	Monthly bright sunshine (hours)	169.4	96.5	98.0	
	% possible bright sunshine	64.3	36.6	36.7	
	% normal bright sunshine	172.9	98.5	22.2	
	Bright Sunshine days	28	25	123.7	
	Monthly global radiation(MJ/m^2)	136.8	98.6	73.6	
	Monthly diffuse radiation (MJ/m^2)	53.7	57.4		
SOIL	Average temperature (°C) @ 9:00am grass level	3.5	2.6	-1.7/-0.5	
	10 cm/20 cm	-1.7/-1.5	-1.0/0.1	3.0/5.6	
	50 cm/100cm	2.8/5.4	3.2/5.9	6.8/8.1	
	150 cm/300cm	6.7/6.8	7.0/8.3		

Saskatoon Stations
SM=interrupted readings (NWMP) about 1892-1900
SE= Eby (pioneer) 1901-41
SA= S toon Airport 1942-
US= Univ. of SK 1915-64

Normals
Global and diffuse radiation = 1961-1990
Soil Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

For Your Information

Temperature Records: (since 1963)

Warmest daily maximum
Nov 06 = 16.8°C; old record = 12.8°C/1969
Nov 16 = 14.2°C; old record = 12.5°C/1979 & 2001
Nov 17 = 15.3°C; old record = 12.8°C/1976
Nov 18 = 12.2°C; old record = 9.5°C/1987 & 1995

Warmest daily minimum
Nov 17 = 4.7°C; old record = 1.0°C/1991
Nov 30 = -0.7°C; old record = -3.0°C/1993

Warmest Mean Monthly Maximum
6.7°C; old record = 5.5°C/1987

Warmest Mean Monthly Average
1.1°C; old record = 0.3°C/1981

Warmest Autumn Mean Minimum
1.3°C; old record = 0.4°C/2005

Warmest Autumn Mean Average
6.7°C; old record = 6.4°C/ 1987

Most No. of Days with Max Temp Greater Than:
0°C: 30; old record =25/1987 & 2004

Monthly Degree-days
Heating: Lowest: 505.8; old record = 530.9/1981

Precipitation Records (since 1963)

Lowest Monthly ppt for all November's
0.4mm; old record = 0.7mm/2004

Lowest No. of ppt days for all November's
1 day; old record = 2 days/1968, 74, 76, & 97

Weather Words for the Weatherwise[1]

Gaeaf (Welsh)
Geimbreadh (Irish)
Hiver (French)
Inverno (Italian)
Invierno (Spanish)
Talvi (Finnish)
Vetur (Icelandic)
Vinter (Norwegian)
Winter (English)

[1] Ager 1998

Saskatchewan Research Council

Monthly Weather Summary

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab. 1963

	December 2009	2009 VALUE	2008 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	-14.0	-14.6	-9.0	
	Extreme monthly maximum (°C/date)	-0.6/01	6.0/01	11.2/1997/14	14.4/1939/05$_{SE}$
	Average monthly **minimum** (°C)	-22.6	-23.4	-18.6	
	Extreme monthly minimum (°C/date)	-33.9/13	-36.9/22	-42.2/1973/31	-43.9/1892/22$_{SM}$
	Monthly **average** (°C)	-18.3	-19.0	-13.9	
	No.of Frost-free days (Temp. > 0°C)	0	0	0.2	
DEGREE-DAYS	Monthly growing (5°C base)	0.0	0.0	0.1	
	Yearly total-to-date growing	1646.3	1741.3	1672.9	
	Monthly heating (18°C base)	1125.6	1147.5	987.7	
	Yearly total-to-date heating	5948.4	5745.8	5809.0	
	Monthly cooling (18°C base)	0.0	0.0	0.0	
	Yearly total-to-date cooling	122.3	134.2	119.1	
PRECIPITATION	Monthly total (mm)	7.2	15.0	18.3	59.2/1950$_{SA}$
	Yearly total-to-date (mm)	319.3	313.8	348.2	
	Greatest daily (mm/date)	3.1/23	2.0/08	14.5/1973/23	28.4/1936/02$_{SE}$
	Measurable precipitation days (≥ 0.2mm)	11	18	11.4	
WIND	Average monthly speed (km/h)	11.6	13.5	15.1$_{SA}$	
	Peak gust (speed/direction/date)	42.3^{N}06	79.2^{NW}02		121^{W}1955/12$_{SA}$
RADIATION	Monthly bright sunshine (hours)	108.8	85.9	85.4	
	% possible bright sunshine	44.9	35.5	35.2	
	% normal bright sunshine	127.4	100.6		
	Bright Sunshine days	26	23	22.8	
	Monthly global radiation(MJ/m^2)	100.6	92.4	95.2	
	Monthly diffuse radiation (MJ/m^2)	48.2	53.2	54.3	
SOIL	Average temperature (°C) @ 9:00am — grass level	-11.8	-7.9		
	10 cm/20 cm	-8.5/-6.3	-7.0/-4.7	-6.6/-5.6	
	50 cm/100cm	-3.3/1.4	-2.3/2.3	-1.7/2.0	
	150 cm/300cm	3.6/6.3	4.2/6.5	3.8/6.4	

Saskatoon Stations
SM=interrupted readings (NWMP) about 1892-1900
SE= Eby (pioneer) 1901-41
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Normals
Global and diffuse radiation = 1961-1990
Soil Temp = 1971-2000 calculated by Env Canada
Wind Normal and Extreme are from Saskatoon Airport

For Your Information

The year finished on a rollercoaster ride with temperatures plunging to depths well below normal in the first part of the month, rising, then descending again into glacial temperatures only to bounce back one more time before once again heading to the bottom of the temperature scale. With seven days below -30°C, including a five day cold snap from December 11th to 15th, it is astonishing that only one extreme daily minimum temperature record was broken. On December 13th, -33.9°C was observed squeaking by the old 1972 daily record of -32.8°C. Luckily, strong winds were absent for practically all of the month lowering the wind chill concern to bearable. Snow shoveling was at a minimum with 7.2 cm accumulating over 11 days. Accompanying the cold weather came a 27% increase in bright sunshine hours.

Weather Words for the Weatherwise

One kind word can warm three winter months Japanese Proverb

Temperature Records: (since 1963)

Lowest daily maximum
Dec 12 = -28.4°C; old record = -23.0°C/1993
Dec 13 = -27.7°C; old record = -23.9°C/1986

Lowest daily minimum
Dec 13 = -33.9°C, old record = -32.8°C/1972

Lowest daily mean
Dec 12 = -30.7°C; old record = -27.0°C/1971
Dec 13 = -30.8°C; old record = -27.3°C/1975

INSTRUMENTS USED AT SASKATOON SRC CRS AND GLOSSARY OF TERMS

(Unless otherwise stated, source for definitions of terms is Environment Canada, 1978)

BEAUFORT WIND SCALE was developed by Admiral Sir Francis Beaufort in 1805 and adopted by the British Navy in 1838. It consisted of 13 degrees of wind strength, from calm to hurricane, based upon the effects of various wind strengths upon the amount of canvas carried by the fully rigged frigates of the period. Over the years it has been modified as needed and in 1946 the scale values (Force Numbers) were defined by ranges of wind speed as measured at a height of 10 meters above the surface. In effect, this transformed the 'Beaufort Wind Force Scale' into the 'Beaufort Wind Speed Scale'. This scale is the current standard scale for visual observations of the wind (Heidorn, 1998).

BRIGHT SUNSHINE is the unobstructed direct radiation from the sun, as opposed to the shading of a location by clouds or by other atmospheric obstructions.

Number of Days is defined as the total number of days when at least 0.1 of an hour of bright sunshine was recorded.

Percentage Possible refers to the ratio of measured bright sunshine hours to the total possible daylight hours in a given period, expressed as a percentage.

Possible daylight hours are taken from the sunrise/set tables provided by the National Research Council of Canada, Herzberg Institute of Astrophysics, Victoria, BC.

Total is the sum of the daily bright sunshine values in hours and tenths of hours as measured by an automated sunshine recorder using voltaic cells.

DEGREE-DAY is an index for various temperature related calculations

Cooling (CDD) is the cooling requirement to achieve a stipulated comfort value in an indoor environment. For most purposes, a temperature of greater than 18°C is considered uncomfortable and supplementary cooling is required. On a specific day, the amount by which 18°C is less than the daily average temperature defines the number of cooling degree-days for that day.

Mathematically: CDD = (T - 18°C) for that day, where T = daily mean temperature in °C if T is equal to or less than 18°C, CDD = 0.

Monthly and annual values of CDD are obtained by summing daily values.

Growing (GDD) is the growing requirement in order for plant growth to proceed. The air temperature must exceed a critical value appropriate to the plant species in question. For many members of the grass family, including most commercial cereals grown on the prairies, a base temperature of 5.0°C has been established. On a specified day, the difference between the daily average temperature and the 5.0°C base temperature defines the number of growing degree-days.

Mathematically: GDD = (T - 5.0°C), for that day, where T = daily mean temperature in °C if T is equal to or less than 5.0°C, GDD = 0.

Daily GDD values are summed to provide totals for the appropriate month, growing season or year.

Heating (HDD) is the heating requirement to achieve a stipulated comfort value in an indoor environment. For most purposes, a temperature of less than 18°C is considered uncomfortable and supplementary heating is required. On a specific day, the amount by which 18°C exceeds the daily average temperature defines the number of heating degree-days for that day.

Mathematically:

HDD = (18°C - T), for that day, where T = daily mean temperature in °C if T is equal to or greater than 18°C, HDD = 0.

Monthly and annual values of HDD are obtained by summing daily values.

EXTREME is the highest or lowest value of a particular element recorded during the period in question.

EXTREME ALL YEARS Temporal comparisons at a point are also of value in some types of climatic studies. Therefore, it is desirable to produce the maximum length of reliable climatic record to carry out studies over a period of time. Data are drawn from the following data sets:

Saskatoon, SRC: 1963 to present

Saskatoon, University of Saskatchewan: 1916 to 1963

Saskatoon, City: 1892 to present

Station locations, exposures and measurement procedures were subject to change during this time period. Data are <u>not adjusted</u> and users are cautioned accordingly.

FROST is recorded on each occasion when the daily minimum temperature is equal to or less than 0°C.

NORMAL VALUE (1971-2000) In climatology it is often useful to make spatial comparisons of particular element values over a common time period. At an interior continental site such as Saskatoon, a period of 30 years is required to produce statistically stable estimates of the more variable elements. To facilitate spatial comparisons, the World Meteorological Organization recommends the standard normal (average) period of thirty years. The current normal period for data analysis at CRS is from January 1st, 1971 to December 31st, 2000. Data derived from CRS conform to this standard, except where noted. The normals for CRS have been calculated using the data collected during this standard period. Where gaps existed, data from the nearest climate station were used and referenced as to being used. (Environment Canada, 1993, 2002, 2004a)

POTENTIAL EVAPOTRANSPIRATION (Thornthwaite Method) is the amount of water which will be lost from a surface completely covered with vegetation if there is sufficient water in the soil at all times for the use of the vegetation. It is computed by means of an empirical formula involving mean monthly temperature and average length of day.

Mathematically: $PET = mT^a$ where PET = Potential of Evaportranspiration; m = % of day length for the month as compared to the year; T = Temperature °C when T is less than or equal to 0; otherwise T = O; and a = yearly heat index. (Thornthwaite and Mather, 1955)

PRECIPITATION

Day is recorded on occasions when the amount of precipitation in a 24-hour period equals or exceeds 0.2 mm water. An asterisk (*) appearing in the average column denotes the occurrence of measurable precipitation on one or more occasions, and that the calculated 30-year average amounts to less than a trace. The so-called climatological day, beginning at 9 a.m. standard time on the date of reference and ending at 9 a.m. the next morning, was employed in record keeping up to January 1994. On February 1, 1994, after consultation with Environment Canada, record keeping was changed to the 24-hour period of 0000 hours - 2400 hours to conform to their reporting of climatological statistics.

Total is the sum of the daily recorded precipitation. The snowfall component of precipitation is recorded as an equivalent amount of liquid water. For particulars on precipitation measurement procedures and instruments, the reader is referred to the Environment Canada publication "*Manual of Climatological Observation's*", 2nd Ed., January, 1978. The notation "T" refers to a trace of precipitation (less than 0.2 mm water equivalent). As of August 7, 1993, total precipitation was measured using a weighing gauge for the winter season and the tipping bucket during frost-free period.

SEASONS Meteorologists prefer to divide the year into four 3-month periods based primarily on temperature. Thus winter is defined as December (previous year), January, and February (DJF); spring as March, April and May (MAM); summer as June, July and August (JJA); and fall as September, October and November (SON). (Lutgens and Tarbuck, 1992)

SOIL TEMPERATURE under a short grass surface with normal snow accumulation, is measured according to procedures outlined in the Environment Canada publication "*Soil Temperature*" January 1, 1976. Depths below surface at which soil temperature measurements are made are: 5 cm, 10 cm, 20 cm, 50 cm, 100 cm, 150 cm and 300 cm. Since soil temperature is affected by profile structure and water content, extrapolation of the measured data is difficult.

SOLAR RADIATION

Diffuse - Total is radiation reaching the earth's surface after having been scattered from the direct solar beam. The instrument used is an Eppley pyranometer with a shade ring (See SOLAR RADIATION-Global- Total).

Global - Total is the sum of the direct solar and diffuse radiation during the period in question. Measurements are carried out on a horizontal surface near ground level and integrated over the whole celestial dome, summing the diffuse and direct components of the solar beam. The temperature-compensated Eppley pyranometer is used. The standard metric unit of measurement is the megajoule per square metre (MJ/m^2). (To facilitate comparison with past years' data: 1.0 MJ/m^2 = 23.895 langleys). Comparison is provided with a provisional average based on 16 years of data (1975-1990).

SPELLS - Temperature spells are defined as days when the daily maximum temperature is higher than or equal to 30°C (hot spell) or the daily minimum temperature is lower than or equal to -30°C (cold spell).

SUNRISE/SUNSET times have been included in this report. They have been acquired from the National Research Council, Canada, Herzberg Institute of Astrophysics.

TEMPERATURE

Average Annual is the average of the daily average temperatures in degrees Celsius (°C) for one year.

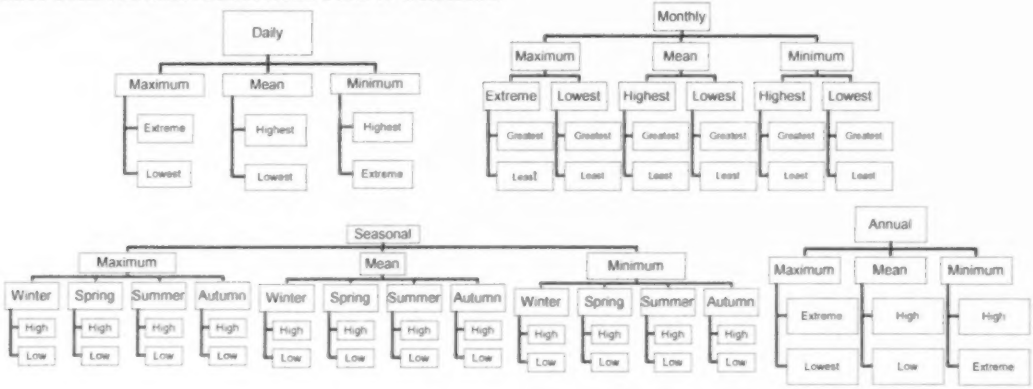
Average Daily is defined as the arithmetic mean of the daily maximum temperature in degrees Celsius (°C) and the daily minimum temperature in degrees Celsius (°C) for the day in question.

Average Maximum is the average of the daily maximum temperatures in degrees Celsius (°C) average over the appropriate time periods. For details concerning measurement procedures, the reader is referred to the Environment Canada publication, "*Manual of Climatological Observations*", 2nd Ed., January, 1978.

Average Minimum is the average of the daily minimum temperatures in degrees Celsius (°C) averaged over the appropriate time periods. Refer to TEMPERATURE-Average Maximum concerning measurement procedures.

Average Monthly is the average of the daily average temperatures in degrees Celsius (°C) for the month under consideration.

TEMPERATURE NOMENCLATURE FLOW CHARTS



WIND CHILL describes a sensation, the way we feel as a result of the combined cooling effect of temperature and wind. This feeling can't be measured using an instrument, so a mathematical formula was developed in 1939 that related air temperature and wind speed to the cooling sensation. This formula was revised in 2001 by a team of scientists and medical experts from Canada and the U.S. with the Canadian Department of National Defence contributing human volunteers. The new index is based on the loss of heat from the face (Environment Canada 2004a).

WAVES - Temperature waves are defined as a sequence of three or more days when the daily maxiumum/minimum temperatures are higher/lower than, or equal to, a set temperature. For a heat wave the temperature is 32°C. (Environment Canada 2005).

WIND SPEED

Average is the average of the hourly wind speeds for the period in question measured in kilometres per hour (km/h). Average hourly wind speeds are obtained from a RM Young Wind Monitor anemometer at a height of 10 m.

Peak Gust refers to the highest instantaneous value recorded by the anemometer system for the period of reference, irrespective of direction and/or duration. Comparison is with published data for Environment Canada, Saskatoon Airport station.

see also **Beaufort Wind Scale**

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